

DOCUMENT RESUME

ED 123 930

FL 007 779

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TITLE Language Teaching Research and the Computer.
SPONS AGENCY Swedish Council for Social Science Research,
Stockholm.
PUB DATE Oct 75
NOTE 57p.; Not available in hard copy due to print quality
of original

EDRS PRICE MF-\$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Computer Assisted Instruction; *Computer Oriented
Programs; *Computer Programs; Data Analysis; *English
(Second Language); *Language Instruction; Programed
Instruction; Programed Materials; Programed Texts;
Second Language Learning; Testing; Textbook
Evaluation; *Textbook Preparation

IDENTIFIERS *Text Analysis

ABSTRACT

Sweden makes great effort to teach every citizen English. However, the simplistic views of language teaching which fad and folklore promote have made it difficult to achieve cumulative, verifiable improvements in teaching. This report briefly reviews previous systems of quantitative, partially automated analysis of language teaching materials which seek to replace dogma and apologetics by scientific method. It then describes the first application of quantitative textual analysis to a language teaching experiment. It describes programs which have been used to edit, update and analyze five sets of teaching materials (approximately 173,000 running words), and to generate and analyze experimental tests which, though simple in concept, have only now, through the use of computers, become both practically efficient and economically feasible. The concluding chapter considers both further applications and implications of this and similar research for the future of language teaching. (Author)

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ED123930

Language Teaching Research and the Computer

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EDUCATION & WELFARE
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Abstract

Sweden makes great effort to teach every citizen English. However, the simplistic views of language teaching which fad and folklore promote have made it difficult to achieve cumulative, verifiable improvements in teaching. This report briefly reviews previous systems of quantitative, partially automated analysis of language teaching materials which seek to replace dogma and apologetics by scientific method. It then describes the first application of quantitative textual analysis to a language teaching experiment. It describes programs which have been used to edit, update and analyze five sets of teaching materials (approximately 173.000 running words), and to generate and analyze experimental tests which, though simple in concept, have only now, through the use of computers, become both practically efficient and economically feasible. The concluding chapter considers both further applications and implications of this and similar research for the future of language teaching.

Acknowledgements

The research described in this report has been funded by a grant from the Swedish Council for Social Science Research, whose support is gratefully acknowledged. Appreciation is also extended to Prof. Karl-Georg Ahlström, of the Department of Educational Research at the Uppsala Teacher Training College, and to his administrative assistant, Ingegerd Zedendahl, who has helped type previous reports, as well as this one. Prof. A. G. Sciarone and Fil. Dr. Anna-Lena Sägval and her colleagues, Berith Brännström and Agneta Berghem, kindly made available some of their computer programs. The opportunity to run these programs on both English and French test data, and thus have an exact understanding of what they do, was most helpful in developing my own programs. Finally, it is no exaggeration that the research could not have been completed without the expert assistance of FK Dag Kyndel.

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30.10.75

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There are a number of reasons that Sweden could significantly contribute to advances in foreign language teaching. Self-interest suggests cogent reasons; the pre-university educational system permits a degree of cooperation with research institutions which would not be possible in most countries; English, the major foreign language, is viewed entirely positively by the young as a key to fun in songs, movies and TV, and, with increasing international awareness, as a key to effective participation in the modern world.

Heretofore, however, in Sweden, as elsewhere, most recommendations for improving language teaching have been doctrinaire or anecdotal. The term debate (Edwardsson, 1970) is entirely appropriate, for dogma and apologetics, partisanship and prescription, have generally prevailed over dispassionate inquiry and rigorous experiment. Mackey (Language Teaching Analysis, 1965, p. 138) describes the situation:

While sciences have advanced by approximations in which each new state results from an improvement, not a rejection, of what has gone before, language-teaching methods have followed the pendulum of fashion from one extreme to the other. So that, after centuries of language teaching, no systematic reference to this body of knowledge exists. The quality of some of the work is so poor as to discredit the entire field of language method, putting the charlatans and the scholars in the same boat. As a result, much of the field of language method has become a matter of opinion rather than fact.

Mackey has worked to change this situation by defining fundamental terms and formulating operational procedures for accurate, impartial language teaching analysis. His work has focused on what is, at the present time, the only source of performance variation which can be objectively analyzed and rigorously controlled. This is the language lessons and tests which are used in the ordinary classroom and in teaching experiments. Other sources of variation can not be studied scientifically without the application of far more sophisticated learning theories than those in current favor (Crothers and Suppes, 1967, p.7, Derwing, 1973) and better instrumentation for observing and recording behavioral events (Mackey, 1972). Moreover, theory and technique are to no avail if the learning tasks, the mini-languages presented in teaching materials and sampled in tests, have not been explicitly defined.

Why then is textual analysis still in its infancy? The simplistic views

of language learning which fad and folklore promote is one explanation. Another is that the number of variables which must be accounted for in any adequate analysis is extremely large. Detailed, accurate description virtually demands the use of a computer, and Mackey (1965, p.453-463) was the first to suggest doing so.

His efforts have been joined by those of his colleagues. Mepham (1973) describes and makes available computer programs for analyzing French teaching materials. LaForge (1972) has used them in establishing the necessity of computational procedures whenever we want to find out if language teaching materials meet particular criteria. He asks how well four widely-used French textbook series conform to their own principles of vocabulary selection, and documents striking discrepancies. This work has been complemented by Sciarone and van Maris (1972, 1973a, 1973b, 1973c, 1974), who have also analyzed four of the best-known and most widely-used French textbooks. Like Laforge, they have shown that even an author's own account of what his textbook contains, though this is scarcely intentional, can be both misleading and inaccurate. Their studies of vocabulary distribution indicate, for example, that words which occur in dialogues often do not re-occur in correlated exercises designed to teach the very vocabulary and grammar which the dialogues exemplify. Sägval (1973, 1974) and Sägval, Bergström and Berghem (1974), have made available to university teachers and researchers morpheme lists for Russian and word frequency lists and word concordances for any language. Sägval et al (1975) briefly describes the programs and some of their applications, including the cooperative development of a Russian beginner's textbook by Carin Davidsson of Uppsala University's Department of Slavic Languages and the Puskin Institute of the University of Moscow.

Quantitative, partially automated analysis has thus been used to determine the accuracy of specific assertions and as an aid to the individual teacher and researcher in planning instruction and preparing language lessons.

The present report describes the first application of quantitative textual analysis to a language teaching experiment. The report describes programs which have been used to edit, update and analyze five sets of teaching materials (approximately 173,000 running words), and to generate and analyze experimental vocabulary tests which, though simple in concept, have only now, through the use of computers, become both practically efficient

and economically feasible. The concluding chapter considers both further applications and implications of this and similiar research for the future of language teaching.

Research in language teaching has always faced a dilemma: if the language behavior under study has been sufficiently complex to approximate real language behavior, it has been humanly impossible, within such complexity, to: 1) provide a rigorous description of every language feature included, 2) state exactly how knowledge of each such feature has been defined, i.e. what use of each feature every teaching procedure associated with it is designed to elicit, and 3) establish that proficiency in each feature, as so defined, has been adequately tested. Yet these criteria must be met if experiments are to be repeatable and the results unambiguous.

Rigorous experiments in language teaching have therefore been confined to investigations of artificial language data (e.g. Yeni-Komshian, 1965) or isolated fragments of a natural language (e.g. Crothers and Suppes, 1967). When investigators have tried to study more complex language learning, as in the Scherer and Wertheimer study (1964) and the "Pennsylvania study" (Smith, 1970), they have not been able to meet the above three criteria.

In the "Pennsylvania study", which has commanded the most attention (Lindblad and Levin, 1970, pp. 8-17, summarize most of what has been written about it), the experimental groups were taught different and incompletely specified subsets of the languages in question (French and German), using different but imprecisely specified methods; and attempts were then made to estimate the effectiveness of these methods by testing the groups on their knowledge of still another subset of the two languages.

For those who must make decisions about foreign language instruction in the school system, this has meant that there are only two available guidelines. They can look to the opinions of experts, people like Lado (1964) and Rivers (1968); but if they do, they will find that the experts do not agree. One has only to read Språkdebatten 1969-70 (Edwardsson, 1970) or Carroll's article (1971) "Current Issues in Psycholinguistics" to realize how tenuous expert opinion really is.

The alternative is to wholly rely on the results of experiments like those of Lindell (1971), Levin (1972) and von Tibor and Oskarsson (1973), experiments which investigate a limited number of language features, what might occur in individual lessons, or parts of lessons. The risk

is that findings which may apply to only a micro-aspect of language learning will be treated as general principles. Special caution is called for when the language behavior which is defined as demonstrating knowledge of particular items or patterns does not resemble and has an unknown relation to ordinary language use.

The problem then is to find a way to maintain experimental rigor when the object of investigation is an integrated subset of natural language which is sufficient in scope to be communicatively adequate in at least some situations of ordinary language use, and in which knowledge of the subset is defined as language behavior which approximates the performance of native speakers. The present research is a first step in this direction.

The point of departure is Mackey's definition of a language teaching method (1965, p. 157). The computer programs analyze a particular selection (subset) of English words in terms of presentation (the linguistic and behavioral contexts in which they occur), gradation (their order of presentation) and repetition (their frequency and distribution patterns within and across diverse presentations). The vocabulary occurs in the teaching materials which have been used by the Department of Educational Research at the Uppsala Teacher Training College in a longitudinal study to estimate the relative efficiency of various allocations of the total time available for English instruction during the first six years of school (Holmstrand, 1975). The assumption is made that these teaching materials represent an appropriate choice, i.e. that there are natural speech situations where a particular selection of the phonological (or graphemic), grammatical and lexical features which they include would be likely to occur, that knowledge of this subset has been so defined that someone proficient in it would be able to use English in at least some of the ways a native speaker does, and in a variety of situations.

Vocabulary was selected as the starting point for several reasons. There was first the practical advantage that usable results would be available sooner. Further, operational procedures for identifying words and parts of words (morphemes) and for assigning strings of input characters to particular word and/or morpheme classes necessarily precedes all other analysis. Finally, and most importantly, lexical analyses would permit the immediate application of the results to experiments

in vocabulary learning, which appears to be the best single measure of foreign language proficiency. Until 1973 Ryden's 1948 study was, curiously, the only available experimental evidence, but research at the Educational Testing Service now provides corroboration derived from a study of very large samples.§

The present system differs from previous systems in a number of ways, and the emphasis in the following paragraphs will be on some of these differences.

Text preparation

Mephram says (1973, p. 59), "...multiple choice, fill-in-the-blank, and other such questions must be completed." This single reference indicates that, for the materials he examined, the task was a simple one. Sciarone and van Maris do not mention this phase, nor do Sägval et al, many of whose texts present, in any case, no such problem, since they were literary texts used in the classroom, not ordinary language teaching materials. Text preparation for the present materials (hereafter EPÅL) was, in contrast, very demanding. One would have preferred to universally follow the rule, "Keypunch what you see" but---and this would probably apply to any sizable body of material---ambiguities, inconsistencies and omissions make this approach impractical. In the introductory materials, for example, the texts often do not specify the complete script for the exercises (an exception is the tape recorded listening drills). A typical drill has the following appearance:

Gissningslek M7

One, two, three. What can you see? I can see
(rep. av alla subst.)

On the facing page, additional information is given:

§The results of this research were kindly made available to me by the Director of Foreign Language Testing at ETS, Mr. John L. D. Clark, but I can not quote directly from the report, which is still only available as a draft presented to the TOEFL (Testing of English as a Foreign Language) Policy Council and the TOEFL Committee of Examiners.

Material: flanobild 5-14, 24-27

Gissningsleken har till syfte att repetera hittills
förekommande substantiv.

A complete script can, in this case, be deduced, and must be if the
keypunched text is to accurately represent the content of the language
lessons.

The above example illustrates another aspect of text preparation. The
assumption that all texts consist of sentences does not apply to language
teaching texts. Because of the prevalence of pattern practice as a drill
type, many texts contain sentence frames as well as sentences. The
present analysis therefore distinguishes between sentence constituents
in a sentence (which are, by definition, fixed) and variable and fixed
constituents in a sentence frame. A list of variable constituents is
bounded on the left by the symbol '<' and on the right by the symbol '>',
Thus,

I can see <a, an, some> <book, chalk, orange>.

The null string is indicated by a zero and an unspecified list
(a not infrequent occurrence) by '<>', e.g.:

Does <>* want <a,ø><book, chalk>?

Other special cases are the fill-ins and multiple-choices Mepham mentions,
which abound in most materials. For studies of vocabulary distribution,
it seems important to supply the expected responses, as Mepham does, but
equally important to retain the distinction the texts make between
ordinary sentences, where each word has the same status, and utterances
in which, although the anticipated reply is only one sentence (rather
than a set of sentences, as in pattern practice), one or more of the
words has a special status. The present system indicates the special
status of fill-ins by prefixing them with a '—'; the correct answer
in a multiple-choice, by the prefix '+' and the accompanying distractors,
by the prefix '-'.

*In such a case the teacher may have been instructed, e.g., to sub-
stitute the names of students in the class.

Thus,

Cats don't usually like — dogs.

I want -a +some chalk.

Sentences are not keypunched if this would represent mere educated guesses. In a frequent drill type, e.g., a reading passage is followed by a series of questions. In general the answers to the questions are built into the reading passage. The passage and the questions are keypunched, but not the answers, since this would represent an attempt to guess at and include in the text the actual outcome of using it in some unknown situation. The goal is to neither suppress information nor to make unwarranted inferences. The keypunched text should represent the method, and not an inadvertent blend of what the method contains with predictions as to what might actually happen when it is implemented. The distinction is easy in theory, but difficult in practice, and it is hoped that a contribution of the current research will be both explicit decision procedures for resolving a number of ambiguities, as well as programs to insure that the conventions adopted are consistently applied.

Keypunching

Like Sciarone and van Maris, but unlike Mephram and S gvall et al, wrap-around is permitted, i.e. a word begun on one card may be continued on the next. A new textual unit is indicated by punching four zeroes in the first four columns of a new card, which also contains, beginning in position 6, the actual name of the unit. When texts have been completely edited (see below), the textual units are automatically numbered, and this is used as the address for information in other data sets concerning the words, sentences or sentence frames in that unit.

A program for symbol translation allows the operator to adapt his keypunching to the symbols which happen to be available or are the easiest to punch on a particular keypunch model.  In contrast to all other systems, cards are never retrieved from the deck for correction by hand. This is not merely in the interests of speed (which does, however, increase enormously when hand correction is eliminated): It is essential to insuring that the data sets which ultimately serve as input to the analytic programs do not have undetected errors. Anyone who has tried to remove isolated cards from a huge deck and to correct and replace them without introducing further errors is aware of the

 To avoid mystifying blanks in printed output it was also used to replace exclamation marks (available on the IBM 029 keypunch but not on the IBM printer!) by the symbol |.

importance of automating correction. §

Correction, Editing and Updating

It is in this respect that the present system differs most sharply from others. Every system of analysis necessarily makes certain assumptions about the data? Have all the assumptions been made explicit? What steps have been taken to insure that the data actually meet these assumptions? To take a simple example, Sciarone and van Maris and Sægvald et al assume that only two symbol sets will occur, a set of letters and a set of punctuation marks. As all numbers are to be written out, they do not include Arabic numerals. Other assumptions in one or more of the systems are that no string will contain more than three marks of final punctuation, that any string consisting of a single character is alphabetic, that certain punctuation marks always indicate the end of a sentence, and that all characters between the first and last alphabetic symbol are legal symbols within a word. In addition, it seems to be assumed that all keypunching conventions will be consistently followed (or rather that a careful proofreader will discover inconsistencies and correct them by hand). While this may apply to very small amounts of data, it is extremely unlikely that any significant amount of data will conform to such expectations. Yet if data are analyzed without first insuring that all assumptions have been met, the results will be of dubious value. For this reason, the present system includes a number of programs which are used to check the current generation of each data set, and to continue generating updated versions until no errors are detected. The major program for detecting errors, ambiguities and inconsistencies is printed in Appendix 1. The list of explanations beginning in statement 41 indicates what this program checks for. The program will optionally store a list of either the orthographic strings (a sequence of characters of any kind, bounded by spaces) or orthographic words (strings from which initial and

§All cards are, of course, pre-numbered, but this alone doesn't make it practical to correct cards by hand. It is simply a precaution against dropping a deck.

final non-alphabetic characters have been stripped[§], and provides selective printing of the records in which errors have been detected. If the error pertains to an entire sentence or sentence frame, this is printed; otherwise only the record(s) with the string in question. Every error checked for has actually been encountered (including, for example, detection of the symbol for zero instead of the letter 'o').

Since periods, question marks and exclamation marks do not always indicate the end of a sentence, the program also asks the reader to check all instances in which any such marks are not the ultimate character in the string. This is to eliminate the possibility that the analysis programs will analyze as sentences embedded quotations and parenthesized sentences within a sentence. Figures 1 - 6 give sample outputs from this program, including a case where final punctuation did and did not indicate the end of a sentence (Figure 2), and where zero was punched instead of 'o'. (Figure 4). The associated proof lines (Figures 3 and 5) are filled in by the proofreader, who then keypunches only the changes required. Another program then produces an updated version. The error detection program is not run until the proofreader has first read the entire data set against the original text, and made a conscientious effort to correct all humanly detectable errors. The proofreader works from a complete printout of a data set with prooflines (Figure 6). Since cards are referenced by the final 4-digit sequence number, the main error detection program, as well as this straight-forward print-out program, allows the user to specify that he wishes a printout of the former sequence number, the rightmost number shown in Figures 3, 5 and 6. Successive generations

[§]The program does permit internal hyphenation, an internal apostrophe and a final apostrophe, if preceded by 's'. All other strings with an apostrophe are printed out so that the analyst can check to see if the occurrence represents a single quote or an apostrophe in an unanticipated environment.

RUN STATISTICS FOR THE DATA SET: HEDV3B2.TEXT2

RUNNING STRINGS:	23873
RUNNING WORDS:	23816
MINIMUM STRING LENGTH:	1
MINIMUM WORD LENGTH:	1
MAXIMUM STRING LENGTH:	30
MAXIMUM WORD LENGTH:	28
STRINGS LONGER THAN 24 CHARACTERS:	1
WORDS LONGER THAN 24 CHARACTERS:	1
MODAL STRING LENGTH:	3
MODAL WORD LENGTH:	3
AVERAGE STRING LENGTH:	4
AVERAGE WORD LENGTH:	4

Figure 1. Summary statistics from a run of the program to detect errors, ambiguities and inconsistencies in the language teaching texts.

PLEASE."

26 1890 33 1890 ✓
 : "FARES, PLEASE. FARES, PLEASE." JANE: "TWO TO THE HOUSES OF PARLIAMENT
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

PLEASE."

3 1891 10 1891 ✓
 : "FARES, PLEASE. FARES, PLEASE." JANE: "TWO TO THE HOUSES OF PARLIAMENT
 : PLEASE." CONDUCTOR: "TWENTY, PLEASE. THANK YOU." Y: "CAN YOU TELL US W
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

YOU."

46 1891 50 1891 ✓
 : PLEASE." CONDUCTOR: "TWENTY, PLEASE. THANK YOU." Y: "CAN YOU TELL US W
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

PLEASE?"

19 1892 26 1892 ✓
 : PLEASE." CONDUCTOR: "TWENTY, PLEASE. THANK YOU." Y: "CAN YOU TELL US W
 : WHEN WE GET THERE, PLEASE?" CONDUCTOR: "OK."
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

"OK."

26 1892 43 1892 ✓
 : WHEN WE GET THERE, PLEASE?" CONDUCTOR: "OK."
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

PARLIAMENT?"

19 1901 30 1901 ✓
 : CATER BUS, THE FRONT SEAT. WHY DON'T YOU AND Y GO ON A BUS FROM PICADILLY
 TO THE HOUSES OF PARLIAMENT?" SO JANE AND Y (THAT'S JANE'S SWEDISH PEN
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

TRAFFIC!"

56 1903 64 1903 ✓
 : O WAITED FOR A BUS NEAR PICADILLY CIRCUS. "LOOK AT THE TRAFFIC!" Y SAID.
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE? *ja*

IT?"

72 1904 3 1905 ✓
 : "YOU CAN'T CROSS THE ROAD TO LOOK AT THE STATUE IN THE MIDDLE. WHO IS I
 T?" "IT'S EROS. HE'S THE GOD OF LOVE," SAID JANE. "HE MUST GET TIRED, ST
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

TIME!"

37 1906 42 1906 ✓
 : T?" "IT'S EROS. HE'S THE GOD OF LOVE," SAID JANE. "HE MUST GET TIRED, ST
 ANDING ON ONE LEG LIKE THAT ALL THE TIME!" SAID Y. JUST THEN A BUS CAME
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE? *ja*

PARLIAMENT?"

36 1907 47 1907 ✓
 : ALONG. "DO YOU GO TO THE HOUSES OF PARLIAMENT?" JANE ASKED. "YES, JUMP O
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE? *ja*

EVERYTHING!"

52 1911 63 1911 ✓
 : S. "GOSH, IT'S HIGH UP HERE, ISN'T IT! YOU CAN SEE EVERYTHING!" "FARES,
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

PLEASE."

16 1912 23 1912 ✓
 : PLEASE. FARES, PLEASE." THE CONDUCTOR CAME ALONG AND STOPPED. "TWO TO TH
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

YOU."

68 1913 72 1913 ✓
 : E HOUSES OF PARLIAMENT, PLEASE." SAID JANE. "TWENTY, PLEASE. THANK YOU."
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE?

PLEASE?"

38 1914 45 1914 ✓
 : "CAN YOU TELL US WHEN WE GET THERE, PLEASE?" ASKED Y. "OK." SAID THE CO
 1. TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOTE? *ja*

Figure 2. Sample of program-detected ambiguities in the texts. 1905-1906, 1907 and 1914 are embedded quotations; the others are not. To insure correct sentence identification by the analysis programs, marks of final punctuation must be deleted from embedded quotations. The numbers to the right of each string indicate where the string begins and ends (position within the record and the record number). The rightmost number(s) indicate which record(s) contain the sentence.

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
"GOSH, IT'S HIGH UP HERE, ISN'T IT! YOU CAN SEE EVERYTHING!" CONDUCTOR 1889

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
"FARES, PLEASE. FARES, PLEASE." JANE: "TWO TO THE HOUSES OF PARLIAMENT 1890

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
"PLEASE." CONDUCTOR: "TWENTY, PLEASE. THANK YOU." Y: "CAN YOU TELL US W 1891

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
"PLEASE." CONDUCTOR: "TWENTY, PLEASE. THANK YOU." Y: "CAN YOU TELL US W 1891

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
MEN WE GET THERE, PLEASE?" CONDUCTOR: "OK." 1892

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
TO THE HOUSES OF PARLIAMENT?" SO JANE AND Y (THAT'S JANE'S SWEDISH PEN 1901

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
D WAITED FOR A BUS NEAR PICADILLY CIRCUS. "LOOK AT THE TRAFFIC!" Y SAID. 1903

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
"YOU CAN'T CROSS THE ROAD TO LOOK AT THE STATUE IN THE MIDDLE. WHO IS I 1904

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
T?" "IT'S EROS. HE'S THE GOD OF LOVE." SAID JANE. "HE MUST GET TIRED. ST 1905

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
ANDING ON ONE LEG LIKE THAT ALL THE TIME!" SAID Y. JUST THEN A BUS CAME 1906

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
ALONG. "DO YOU GO TO THE HOUSES OF PARLIAMENT?" JANE ASKED. "YES, JUMP O 1907

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
S. "GOSH, IT'S HIGH UP HERE, ISN'T IT! YOU CAN SEE EVERYTHING!" "FARES, 1911

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
PLEASE. FARES, PLEASE." THE CONDUCTOR CAME ALONG AND STOPPED. "TWO TO TH 1912

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
E HOUSES OF PARLIAMENT, PLEASE." SAID JANE. "TWENTY, PLEASE. THANK YOU." 1913

1 2 3 4 5 6 7 8
123456789012345678901234567890123456789012345678901234567890
"CAN YOU TELL US WHEN WE GET THERE, PLEASE?" ASKED Y. "OK." SAID THE CO 1914

Figure 3. Proof lines associated with the preceding error messages (Figure 2). The line to the immediate left shows how the proof-reader notes changes. The asterisk in position 64 means replacement by a blank.

P46. INPUT DATA SET IS: MEDY3A2.TEXT2

~SUMMER.	1	199	8	199	✓
1. ILLEGAL INITIAL NON-ALPH SYMBOL					
~WINTER.	10	199	17	199	✓
1. ILLEGAL INITIAL NON-ALPH SYMBOL					
EXAMPLE: I	17	293	25	293	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
NINETEEN-HUNDRED-SEVENTY-ONE	39	413	66	413	✓
1. STRING LENGTH EXCEEDED					
2. WORD LENGTH EXCEEDED					
SCHOOL	70	646	3	647	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
VINERY.	29	778	35	778	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
VITVERN	37	778	43	778	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
MILAREN.	49	778	56	778	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
NINETEEN-HUNDRED-SEVENTY-THREE.	71	785	29	786	✓
1. STRING LENGTH EXCEEDED					
2. WORD LENGTH EXCEEDED					
SUNDSTRÖM.	9	787	18	787	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
ONE-THOUSAND-TWO-HUNDRED-FIFTY	70	792	27	793	✓
1. STRING LENGTH EXCEEDED					
2. WORD LENGTH EXCEEDED					
P.S.	70	802	1	803	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
NINETEEN-HUNDRED-SEVENTY-THREE.	71	806	29	807	✓
1. STRING LENGTH EXCEEDED					
2. WORD LENGTH EXCEEDED					
SUNDSTRÖM.	9	808	18	808	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
ONE-THOUSAND-TWO-HUNDRED-FIFTY	70	813	27	814	✓
1. STRING LENGTH EXCEEDED					
2. WORD LENGTH EXCEEDED					
P.S.	70	823	1	824	✓
1. ORTHOGRAPHIC WORD HAS ILLEGAL MEDIAL SYMBOL					
NINETEEN-HUNDRED-SEVENTY-THREE.	71	859	29	860	✓
1. STRING LENGTH EXCEEDED					
2. WORD LENGTH EXCEEDED					

Figure 4.

The printout to the immediate left (647) shows detection of a zero punched instead of the letter 'o'. In contrast to the strings in Figure 2, the sentences in which these strings occur have not been printed, since the errors are of a type which can be corrected without contextual reference.

2	1	2	3	4	5	6	7	8	
4	123456789012345678901234567890123456789012345678901234567890								9974
6	4 THE CUPBOARD. SHE ALWAYS CROSSES THE STREET AT THE RIGHT PLACE.								
8	1	2	3	4	5	6	7	8	
10	123456789012345678901234567890123456789012345678901234567890								9979
12	MR AND MRS PARKER BOTH WORK IN TOWN. MR PARKER WORKS IN A SHOP. MRS PARKER								
14	1	2	3	4	5	6	7	8	
16	123456789012345678901234567890123456789012345678901234567890								9981
18	ER WORKS IN A FACTORY. MR AND MRS JAMES BOTH TEACH IN OUR SCHOOL. MR JAMES								
20	1	2	3	4	5	6	7	8	
22	123456789012345678901234567890123456789012345678901234567890								9982
24	ES TEACHES ENGLISH. MRS JAMES TEACHES GEOGRAPHY.								
26	1	2	3	4	5	6	7	8	
28	123456789012345678901234567890123456789012345678901234567890								9983
30	WE CROSS THE STREET AT THE CORNER. ON HIS WAY TO THE SCHOOL PETER "RUSSE"								
32	1	2	3	4	5	6	7	8	
34	123456789012345678901234567890123456789012345678901234567890								
36	S THE STREET HERE. THE BOYS DRESS IN THEIR BEDROOM. PETER DRESSES BEFORE								
38	1	2	3	4	5	6	7	8	
40	123456789012345678901234567890123456789012345678901234567890								9985
42	HE COMBS HIS HAIR. THEY FETCH THE NEWSPAPER FROM THE LETTER-BOX.								
44	1	2	3	4	5	6	7	8	
46	123456789012345678901234567890123456789012345678901234567890								9987
48	ANN FETCHES IT FOR ME WHEN I AM ILL. BILL USES HIS LEFT HAND WHEN HE WRI								
50	1	2	3	4	5	6	7	8	
52	123456789012345678901234567890123456789012345678901234567890								9988
54	YES. ALL THE OTHER CHILDREN USE THEIR RIGHT HAND. THE WASH BEFORE THEY								
56	1	2	3	4	5	6	7	8	
58	123456789012345678901234567890123456789012345678901234567890								9989
60	DRESS. HE WASHES BEFORE HE DRESSES.								
62	1	2	3	4	5	6	7	8	
64	123456789012345678901234567890123456789012345678901234567890								
66	QUO 4 20								
68	1	2	3	4	5	6	7	8	
70	123456789012345678901234567890123456789012345678901234567890								9991
72	A NEW GIRL. PETER: THERE'S A NEW GIRL IN OUR CLASS. SHE'S CALLED MADELEI								
74	1	2	3	4	5	6	7	8	
76	123456789012345678901234567890123456789012345678901234567890								9992
78	ME. MOTHER: OH, WHERE DOES SHE COME FROM? PETER: FROM FRANKFURT. IN GERM								
80	1	2	3	4	5	6	7	8	
82	123456789012345678901234567890123456789012345678901234567890								9993
84	ANY. MOTHER: DOES SHE LIVE HERE NOW? PETER: YES, SHE DOES. AND HER FAMIL								
86	1	2	3	4	5	6	7	8	
88	123456789012345678901234567890123456789012345678901234567890								9994
90	Y, TOO. MOTHER: WHAT DOES HER FATHER DO? PETER: I DON'T KNOW. MOTHER: DO								

of each data set are produced until no further errors have been detected. At this point, another program produces an alphabetized list of strings. The proof-reader now checks for misspellings and inconsistencies which can easily be bypassed when reading a running text. For example, one of the books in the series uses the strings 'teapot', 'tea-pot' and 'tea pot', and the strings 'tra-la la-la la' and 'tra-la-la-la-la' as well as other variations, and it is of course desirable to remove all such inconsistencies. Another program selectively prints the records where any such unwanted forms occur. None of the analysis programs is run until an acceptable set has been produced..

Coding

When all data sets are acceptable, each textual unit is then numbered, and the analyst is now ready to classify each unit in terms of the use to which the material is intended to be put. This classification system is also unique. In the beginning, an attempt was made to use prior classification systems, taking Mackey's, which is certainly one of the most elaborate, as a point of departure and trying also to incorporate ideas from other systems (e.g. Lee, 1972). In practice, however, it proved impossible to decide to what class a particular unit should belong, with the exception of the most simple exercise types (Listening drills, e.g., in which the only instruction is that the teacher is to play a tape).

The idea of labeling each unit was therefore abandoned. Instead, each drill is coded for the presence or absence of certain features, and this code is stored as a pattern of binary bits. The feature list is by now quite elaborate, but the user need take account of only the features he is interested in for a particular purpose. Thus, a sort-out of, say, all words, which occur in so general a category of exercises as those in which the stimulus is oral and the responses non-verbal, can be easily achieved, but it is no more difficult to sort out words which meet a much longer list of specifications.

At the present time, such features as the following are indicated in the bit pattern associated with each unit, and, thereby, with all the sentences and words in that unit: Is pictorial material used? If yes, one can then specify the class of illustration (slides, or not, flashcards or not, etc). Is a single stimulus class used (the teacher plays a tape-recorded dialogue, e.g.). Are there auxiliary stimuli (e.g. the tape-recorded dialogue is to be played while the teacher is instructed to point to flashcards). Is there some response choice? If yes, what feature or features control the response (grammatical information, semantical, situational, etc.). Is it the intention of the writer that responses be choral, in small groups, individualized, or all three? Is it possible to tell from the directions what is to happen, and how often, what is to happen, but not how often, or neither of the above? Is part or all of the expected behavior unspecified? Is the exercise grammatically homogenous, lexically homogenous, situationally homogenous? Do the intended responses require duplication, commutation, operations (deletion, permutations, substitutions), and/or construction (the response is not some specific manipulation of the stimulus). This brief list ought to dissuade those who believe an intelligible statement has been made when one talks of the 'direct method', or 'grammar-translation', or any of the other facile labels which are prevalent. To define a method is to fully specify a set of relations between a particular subset of a language and particular classes of expected behavior. By directing the user to answer a series of yes/no questions there is some assurance that all factors which may be relevant can be taken into account, not just those which previous bias might lead one to notice. Then, by subsequent automated analysis, one can objectively answer specific questions. How many unique feature configurations, i.e. exercise types, does the method contain? What is the distribution of lexical and grammatical features within and across these types?

Analysis

As in all other analyses orthographic sentences and words are first identified and stored. The major difference here is in the particular information which is associated with each word and sentence, how this information is formatted, and the uses to which it is later put. Certain common terms have been re-defined to accord with the special characteristics of language teaching materials. In all other systems, frequency is defined as frequency in running words (the ordinary definition) and distribution patterns (rate of intake, recurrence distance, dispersion) are calculated by dividing the text into segments having a fixed length in running words (Mephram, e.g. subdivided his materials into 200 word chunks).

The difficulty with regard to frequency is that words which occur as fixed or variable constituents can not be meaningfully equated with sentence constituents, nor can words having a special status e.g. the distractors in a multiple choice exercise, be equated with words which do not. The calculation of distribution patterns presents similar problems. The average number of new words per fixed length segment, e.g., is not meaningful when the running words are a blend of fixed and variable constituents. Frequency is therefore calculated separately for the different word classes, and subsequent programs list the frequency with which each word has occurred in each of the classes. One can thus find out which words have occurred both as the distractors in a multiple-choice exercise and as the right answer in others, which words have occurred only as variable constituents, or as both variable and fixed constituents, etc. Through a series of sorts and merges and programs for deriving the complementary and intersection sets from any two samples, lists can be prepared indicating for each word its position of absolute first occurrence, its position of first occurrence in a unit of a particular type, its frequency in all units of that type, in how many different lesson types each word occurs, and its frequency within each such type in each of the major classes. Such lists can be generated for individual lessons, a complete text, or a series of texts. Describing frequency and distribution patterns in such terms reveals more about a language teaching method than when all words are treated alike and the text is divided into units appropriate to ordinary written language. Although only words are presently subclassified in this way, it is clear that syntactic structures could be similarly analyzed. In future analyses, another dimension which will be used in calculating frequency and distribution patterns is time. Almost all language teaching materials state approximately how much time each unit is expected to take. This information can be used to calculate such measures as the average number of new words which are introduced per time unit, the average number of repetitions, the average recurrence distance, in brief, any frequency

and distribution patterns which indicate variations within and between methods which are likely to be significant. There is at present generally no control of variation in teaching materials, since this also requires automated procedures. It therefore seems inevitable that units which textbook authors estimate will require the same amount of time will vary enormously in such matters as the number of absolute first occurrences, the number of first occurrences in a unit of that type, and the number of repetitions, as well as in the variety of distinct lesson types which are estimated to require the same amount of time. Mephram (1973) and Laforge (1972) have already established remarkable variation when such calculations are made in ordinary terms, and Sciarone and van Maris' (1972, 1973c) analysis of the contrasts in vocabulary between dialogues and "correlated" exercises also indicates the wide differences to be expected when frequency and distribution patterns are calculated with respect to feature configurations and time.

3 Testing the System: A Pilot Experiment to Estimate the Role of
Classroom Instruction and Outside Media in the Learning of English
Vocabulary

To a psycholinguist, one of the most interesting facts about Sweden is that knowledge of English is viewed entirely positively. It is a mark of education and, for the young, a key to the fun and action of so many songs and entertainments. School-age Swedes may therefore be expected to learn as much English as they can, whenever they can. What English do they learn? Where do they learn it?

Swedes now begin the formal study of English in grade 3, but it is apparent that, in today's Sweden, at least some Swedes have begun to learn some English before grade 3, and that at least some of what they learn from that time on is learned outside the classroom.

We are thus led to a question of considerable practical, and this includes economic, importance to those who determine educational policy in Sweden. What are the roles of present classroom instruction and informal exposure ---TV, movies, records and tapes, radio, books and periodicals---in the learning of English?

Because even a partial answer to this question could contribute to an improvement in both the content and the methods used to teach English in the schools, it seemed that a pilot experiment designed to estimate the relative contribution of classroom instruction and informal exposure to vocabulary learning would be an appropriate first test of the potential applications of the system.

Rationale

As noted above (p. 5) vocabulary learning is probably the best single measure of foreign language proficiency.

A possible explanation is that while it is possible to produce sentences which are grammatically correct within a limited vocabulary, fluency implies the ability to unhesitatingly select the vocabulary appropriate to diverse situations without reduction in either speed or grammatical correctness. We can imagine a fairly fluent speaker who commands only a limited number of grammatical patterns but has a large vocabulary; but we can not imagine the reverse. Also in whatever way we may define "knowing a word", part of this knowledge will include grammatical knowledge (This excludes as evidence of knowledge, the kind of rote performance which might be elicited from someone who had successfully memorized a bilingual word list). In contrast, however we may define "knowing a grammatical pattern", it is possible to find evidence for such knowledge which allows

practically no inferences about knowledge of vocabulary (see e.g., Berko, 1958).

It therefore seemed reasonable to suppose that vocabulary tests would be the most efficient way of approaching the question at hand. To do so, however, requires explicit information concerning the vocabulary in the language teaching materials which the students have used in the classroom. At the time the experiment was designed, some of the present programs had not been written, while others needed revisions to improve both efficiency and versatility. Nevertheless, the system had reached a point where preliminary testing was in order.

The subjects were 268 of the Swedish students[§] who have been studying EP/L English since grade 1 (begun at age 7). At the time of the experiment they were between 11 and 12 years old and had almost completed grade 5. Potential words were generated as follows: A list of the diversity of words, 3717, which had occurred in the approximately 173,000 running word occurrences in the teaching materials they had used during their 4 $\frac{1}{2}$ years of instruction was derived by a series of sorts and merges of the then current generation of each of the 13 data sets, and the program which stores the diversity of words occurring in one or more data sets. To obtain a comparable list of non-classroom words, the 5000 words which occurred most frequently in a 5-million word sample of the published materials to which U.S. students are exposed from age 8 through 14 (Carroll et al, 1971) were keypunched. The two lists were then merged, in order to derive a list of the words unique to the non-classroom list, 3098. This list was then merged with a list of the words which had occurred in a sixth set of teaching materials, one to which the students had been exposed to varying and unknown degrees, to derive a final non-classroom list, 2809, from which all such words had been eliminated.

From each list, potential test words were then selected by applying the following criteria. 1) They should be ostensibly definable nouns, adjectives or verbs, words which could occur in one of the test frames, Can you point to the -----? Is that one -----? Do you like to -----? 2) They should be words which there is no reason to suppose either especially 'easy' or especially 'hard' for Swedish learners. An easy word would be an obvious cognate (hat:hatt, green:grön); a 'hard' word, one

[§] Actually, a somewhat greater number of students were tested, but were sorted out for reasons to be explained below.

whose phonetic and graphic similarity to Swedish could be misleading (e.g. the English word stool resembles Swedish stol, but the English equivalent of this word is chair). It can easily be seen that inadvertent bias could be introduced into the experiment if one of the tests had a greater proportion than the other of words in either category. Somewhat surprisingly, there were very few words in either list which met---or, to be more accurate, appeared to meet (more about this below)---both criteria: approximately 60 nouns and 15 adjectives and verbs, respectively, in each of the two lists. A computer program was then written which would generate individualized tests from a list of test words, a specification of how many instances of each sentence frame there should be, and class lists stored on the computer which contained information about each student who was to take the test. Each test included 40 nouns, 5 adjectives and 5 verbs occurring in the appropriate frames and the students were asked to write the translation in the blank immediately to the right of each test word. Figure 7 shows a sample test for the classroom words; Figure 8, for the non-classroom words. Translation was the set task for the following reasons:

- 1) Provided scoring can be objective, it establishes unambiguously whether the student knows the meaning of the word in the particular context. The role of chance in choosing a correct response is eliminated.
- 2) The behavior required does not resemble behavior which was required in the classroom, but it does resemble the actual behavior of people using a foreign language. It is common to ask for translations of individual words ("What does 'x' mean?" "How do you say 'x'.").
- 3) If students do learn words through outside exposure, they presumably do so partly with the help of TV and movie subtitles, i.e. translation.
- 4) The test maker is not required to guess what words would be suitable "distractors". At the same time, subsequent analysis of the responses is likely to suggest rational principles for choosing distractors in multiple-choice tests, and even in giving empirical evidence for the suitability of particular words.
- 5) If more than one response is appropriate, then more than one response can be accepted. This accords with the actual facts of language usage.

The tests were administered by the classroom teacher, who had been informed in advance of the purpose of the tests (the information sent them is given in Appendix 2). Analysis then proceeded as follows:

1. The test responses were punched in free form as shown in Figure 9. The beginning of a new test was indicated by punching the student identification printed on each test in the first three columns of a new card. It may be of practical interest to note that keypunching the responses of the 268 students to the two tests took approximately two weeks.
2. An error detection program was then repeatedly run on successive

ERINJELM
BASTA HELENA,
NU KAN DU EN MAJSSA ENGELSNA OKO. SKA DU VISA UPP FÖR MIG EN UEL AV VAD DU KAN AR DU SKALL. GUR SA HAR BARA. SKRIV DET
SVENSKA ORDET SÅ TACKS MOTSVARA SISTA ORDET I VARJE ALDANSTÄNDE MENING. DVS DET OAD SOM BOKJAR MED ETT TANKSTRECK. TVE
KAR DU FÖR ETT VISST OKO DET GUK JAG OFTA HAR DET GÄLLER SVENSKA OKO FÖR JAG AR JU E.GELSKTALANDE GISSA BARA. HAR
KOMMER NÄRA EXEMPLE: A. CAN YOU POINT TO THE CAT? B. IS THAT ONE GREEN? C. DO YOU LIKE TO DANCE?
JAG ANTAR ATT DU SKREV ORDEN _KATT_, _GRÖN_, OCH _DANSA_. NU AR DET BARA ATT FÖRSÄTTA. SKRIV GÄRNA SÅ TYDLIGT DU KAN.
TACK SKA DU HA.

PERSONNUMMER: 63-10-09-1100 KLASS: 56 GRUPP: 4 ELEV NR: 410

SIDA 1

- | | | |
|---------------------------------------|--------------------------------------|------------------|
| 1. CAN YOU POINT TO THE _ANIMAL? | 2. CAN YOU POINT TO THE _BAG? | <u>unska</u> |
| 3. CAN YOU POINT TO THE _BACON? | 4. CAN YOU POINT TO THE _BIRD? | <u>lignol</u> |
| 5. CAN YOU POINT TO THE _DISCUIT? | 6. CAN YOU POINT TO THE _CAGE? | <u>bd</u> |
| 7. CAN YOU POINT TO THE _DELL? | 8. CAN YOU POINT TO THE _BOOT? | <u>bd</u> |
| 9. CAN YOU POINT TO THE _BOX? | 10. CAN YOU POINT TO THE _BOTTLE? | <u>bd</u> |
| 11. CAN YOU POINT TO THE _BUTTER? | 12. CAN YOU POINT TO THE _CARRIAGE? | <u>garage</u> |
| 13. CAN YOU POINT TO THE _CHIMNEY? | 14. CAN YOU POINT TO THE _CHAIR? | <u>stol</u> |
| 15. CAN YOU POINT TO THE _CHEESE? | 16. CAN YOU POINT TO THE _COTTAGE? | <u>bank</u> |
| 17. CAN YOU POINT TO THE _CURTAIN? | 18. CAN YOU POINT TO THE _DESK? | <u>bank</u> |
| 19. CAN YOU POINT TO THE _DRESS? | 20. CAN YOU POINT TO THE _FOX? | <u>borg</u> |
| 21. CAN YOU POINT TO THE _GIRL? | 22. CAN YOU POINT TO THE _GRAPE? | <u>grönsak</u> |
| 23. CAN YOU POINT TO THE _GUINEA_PIG? | 24. CAN YOU POINT TO THE _HILL? | <u>name</u> |
| 25. CAN YOU POINT TO THE _LEG? | 26. CAN YOU POINT TO THE _MONKEY? | <u>aka</u> |
| 27. CAN YOU POINT TO THE _MONEY? | 28. CAN YOU POINT TO THE _NURSE? | <u>syke</u> |
| 29. CAN YOU POINT TO THE _ORANGE? | 30. CAN YOU POINT TO THE _PICTURE? | <u>bid</u> |
| 31. CAN YOU POINT TO THE _PUPPY? | 32. CAN YOU POINT TO THE _SNAKE? | <u>modra</u> |
| 33. CAN YOU POINT TO THE _STREET? | 34. CAN YOU POINT TO THE _STOVE? | <u>regn-damm</u> |
| 35. CAN YOU POINT TO THE _TURKEY? | 36. CAN YOU POINT TO THE _VEGETABLE? | <u>salat</u> |
| 37. CAN YOU POINT TO THE _UMBRELLA? | 38. CAN YOU POINT TO THE _WALL? | <u>zoo</u> |
| 39. CAN YOU POINT TO THE _WINDO? | 40. CAN YOU POINT TO THE _ZOO? | <u>zoo</u> |
| 41. IS THAT ONE _BIG? | 42. IS THAT ONE _EMPTY? | <u>alla</u> |
| 43. IS THAT ONE _PINK? | 44. IS THAT ONE _SOFT? | <u>alla</u> |
| 45. IS THAT ONE _TENDER? | 46. DO YOU LIKE TO _PAINT? | <u>pa</u> |
| 47. DO YOU LIKE TO _PLAY? | 48. DO YOU LIKE TO _SKATE? | <u>pa</u> |
| 49. DO YOU LIKE TO _SMILE? | 50. DO YOU LIKE TO _SMOKE? | <u>rika</u> |

Figure 7. Copy of the computer-generated test of classroom words.

LENA

LOVGREN

BASTA LENA, JAG HOPPAS ATT DU INTÄR TRUTT FÖR NU KUNNE DET FLERA AND. PRECIS SÄM FÖRUT SKA DU SKAIVA DET SVENSKA OCH DET SOM TYCKS
 NOTVÄRKA SISTA ORDET I VARJE NEDANSTÄENDE MENING, OVS DET ORD SOM RÖJER MED ETT FANASTRICK.

1. CAN YOU POINT TO THE _ARROW? _____
2. CAN YOU POINT TO THE _BARN? children
3. CAN YOU POINT TO THE _BEAST? _____
4. CAN YOU POINT TO THE _BEADS? _____
5. CAN YOU POINT TO THE _BRICK? brick
6. CAN YOU POINT TO THE _BLANKET? _____
7. CAN YOU POINT TO THE _BUNDLE? girl
8. CAN YOU POINT TO THE _BUTTERFLY? _____
9. CAN YOU POINT TO THE _BUTTON? stayed
10. CAN YOU POINT TO THE _CANDY? _____
11. CAN YOU POINT TO THE _CHIN? _____
12. CAN YOU POINT TO THE _CLOSET? _____
13. CAN YOU POINT TO THE _CULT? _____
14. CAN YOU POINT TO THE _CLOUD? _____
15. CAN YOU POINT TO THE _COIN? _____
16. CAN YOU POINT TO THE _COLLAR? _____
17. CAN YOU POINT TO THE _DORKEY? _____
18. CAN YOU POINT TO THE _DUT? _____
19. CAN YOU POINT TO THE _FEATHER? _____
20. CAN YOU POINT TO THE _FIST? _____
21. CAN YOU POINT TO THE _FROG? _____
22. CAN YOU POINT TO THE _FUR? _____
23. CAN YOU POINT TO THE _GATE? gate
24. CAN YOU POINT TO THE _GLUE? _____
25. CAN YOU POINT TO THE _JAR? _____
26. CAN YOU POINT TO THE _JELLY? _____
27. CAN YOU POINT TO THE _INK? _____
28. CAN YOU POINT TO THE _KITE? _____
29. CAN YOU POINT TO THE _LID? _____
30. CAN YOU POINT TO THE _MUD? _____
31. CAN YOU POINT TO THE _NEEDLE? _____
32. CAN YOU POINT TO THE _PAIL? _____
33. CAN YOU POINT TO THE _PASTURE? pastor
34. CAN YOU POINT TO THE _PATH? _____
35. CAN YOU POINT TO THE _PEACH? _____
36. CAN YOU POINT TO THE _POND? _____
37. CAN YOU POINT TO THE _RUG? _____
38. CAN YOU POINT TO THE _SIDEWALK? _____
39. CAN YOU POINT TO THE _SUIT? _____
40. CAN YOU POINT TO THE _TOAD? _____
41. IS THAT ONE _COOL? kolt
42. IS THAT ONE _DUSTY? _____
43. IS THAT ONE _PALE? _____
44. IS THAT ONE _PALE? _____
45. IS THAT ONE _ROUGH? _____
46. DO YOU LIKE TO _DIG? _____
47. DO YOU LIKE TO _LEAP? _____
48. DO YOU LIKE TO _SLIDE? _____
49. DO YOU LIKE TO _WASH? _____
50. DO YOU LIKE TO _WASH? _____

NU ÄR DET SLUT. ETT HJÄRTLIGT TACK. HA TREVLIGT UNDER SOMMAR LOVET. HÄLSNINGAR.
 NANCY BELMORE

Figure 8. Copy of the computer-generated test of non-classroom words.

TSIA, 5010 . 11-2

414
1 DJUR 2 VÄSKA 3 SKINKA 4 FÄGEL 5 KAKA 6 7 DOCKA 8 9 KARTONG 10 11 SMÖR
12 13 14 STUL 15 OST 16 17 18 BÄNK 19 KLÄNNING 20 LÅDA 21 FLICKA 22 23 G
RIS 24 HALL 25 KNÄ 26 APA 27 PENGAR 28 SJUKSKÖTERSKA 29 APELSIN 30 TAVLA
31 VALP 32 SNACKA 33 GATA 34 STAVA 35 TURKIET 36 37 ALARMKLACKA 38 GOLV
39 FÖNSTER 40 ZOO 41 STOR 42 43 RÅSA 44 45 TENDER 46 PEKA 47 SPELA 48 4
9 LE 50 RÖKA
052
1 DJUR 2 VÄSKA 3 BACON 4 FÄGEL 5 KAKA 6 GARAGE 7 RINGKLOCKA 8 BÄT 9 LÅDA
10 11 MEN 12 13 BID 14 STOL 15 16 GATA 17 18 BÄNK 19 DRESS 20 KÖR 21 F
LICKA 22 GRAPEFRUKT 23 KARSSVIN 24 NÄNN 25 VAGG 26 APA 27 PENGAR 28 SYST
ER 29 APPELSIN 30 TAVLA 31 32 ÖRM 33 GATA 34 STÖVEL 35 36 BORD 37 38 VAG
G 39 FÖNSTER 40 ZOO 41 STOR 42 ORDET 43 SKAR 44 SOFFA 45 46 PIANO 47 SPE
LA 48 SKIDOR 49 LE 50 SNOK
410
1 DJUR 2 VÄSKA 3 BACON 4 FÄGEL 5 KAKA 6 7 RINGKLOCKA 8 BÄT 9 LÅDA 10 11
12 GARAGE 13 14 STOL 15 CHIPS 16 17 STAD 18 BÄNK 19 DRESS 20 SYSTER 21 FLI
CKA 22 GRAPEFRUKT 23 MARSVIN 24 NÄNN 25 26 APA 27 PENGAR 28 SYSTER 29 OR
ANGE 30 BILD 31 32 SNACKA 33 GATA 34 35 TURKIET 36 VEGETARIAN 37 38 EFTE
RÄNN 39 FÖNSTER 40 ZOO 41 STOR 42 TORN 43 SKAR 44 OFTA 45 46 PEKA 47 SP
ELA 48 49 LE 50 RÖKA
406
1 DJUR 2 VÄSKA 3 SKINKA 4 FÄGEL 5 KAKA, KEX 6 7 KLOCKA 8 KASTRULL 9 LÅDA
10 KANNA 11 SMÖR 12 SAMLING 13 SKYNNING 14 STOL 15 OST 16 17 18 BÄNK 19
KLÄNNING 20 RÄV 21 FLICKA 22 GRAPEFRUKT 23 GRIS 24 25 BEN 26 APA 27 PEN
GAR 28 SJUKSKÖTERSKA 29 APELSIN 30 TAVLA, BILD 31 PUPPA 32 SNOK 33 GATA
34 35 TURKIET 36 VEGETARIAN 37 DOCKA 38 GOLV 39 FÖNSTER 40 DÅRPAK 41 S
TOR 42 TÅ 43 SKAR 44 SAFT 45 TÄNDARE 46 BETALA 47 SPELA 48 49 LE 50 RÅK
417
1 DJURET 2 VÄSKA 3 BECON 4 FÄGEL 5 KAKA 6 7 DOCKA 8 BÄT 9 LÅDA 10 TEKANN
KA 11 SMÖR 12 13 14 STOL 15 16 17 KONTAIN 18 BÄNK 19 KLÄNNING 20 21 FÖICK
A 22 23 GRIS 24 HALLA 25 STEK 26 APA 27 PENGAR 28 NOS 29 APELSIN 30 AFFI
CH 31 32 33 GATA 34 35 36 37 38 39 FÖNSTER 40 ZOO 41 STOR 42 43 LITEN 44
45 TENDER 46 PEKA 47 SPELA 48 49 LE 50 RÖKA
412
1 DJUR 2 VÄSKA 3 BACON 4 FÄGEL 5 KAKA 6 7 KLOCKA 8 9 ASK, LÅDA 10 11 SMÖ
KA 12 FORTSÄTT 13 14 STOL 15 OST 16 17 18 BÄNK 19 KLÄNNING 20 FOX 21 FLIC
KA 22 23 MARSVIN 24 25 KNÄ 26 APA 27 PENGAR 28 SJUKSYSTER 29 ORANGE 30 A
FFLICH 31 32 SNACKA 33 GATA 34 35 36 GRÖNSAKER 37 38 39 FÖNSTER 40 ZOO 4
1 STOR 42 TÅ 43 RÅSA 44 FÖRSIKTIGT 45 TÄNDARE 46 MÅLA 47 SPELA 48 ÅKA 5
KRIDSOR 49 LE 50 RÖKA
413
1 DJUR 2 VÄSKA 3 BECON 4 FÄGEL 5 KAKA 6 7 DOCKA 8 BÄT 9 LÅDA 10 11 SMÖR
12 13 14 STOL 15 16 17 18 BÄNK 19 KLÄNNING 20 RÄV 21 FLICKA 22 23 GRIS 24 REKT
31 25 26 APA 27 PENGAR 28 NÅSA 29 APPELSIN 30 AFFICHER 31 32 33 GATA 34
35 36 FRUKT 37 38 39 FÖNSTER 40 ZOO 41 STOR 42 43 KÅR 44 45 46 47 SPELA
48 KLÖL 49 LE 50 RÖKA
365
1 DJUR 2 VÄSKA 3 FLÄSK 4 FÄGEL 5 KARAMELL 6 7 8 9 LÅDA 10 11 12 13 14 ST
OL 15 OST 16 17 18 BÄNK 19 KLÄNNING 20 RÄV 21 FLICKA 22 EN FRUKT 23 GRIS
24 VAGG 25 26 APA 27 PENGAR 28 SJUKSYSTER 29 APELSIN 30 TAVLAN 31 VALP
32 SNOK 33 GATA 34 35 36 GRÖNSAK 37 38 39 FÖNSTER 40 DJURPARK 41 STOR 42
43 ROSA 44 UNDERBAR 45 46 47 SPELA 48 ÅKA SKRIDSOR 49 LE 50 RÖKA
371
1 DJUR 2 VÄSKA 3 FLÄSK 4 FÄGEL 5 KAKA 6 7 KLOCKA 8 9 LÅDA 10 11 SMÖR 12
GARAGE 13 14 15 OST 16 17 KYRKOGRAD 18 BÄNK 19 KLÄNNING 20 RÄV 21 FLICK
A 22 GRAPEFRUKT 23 24 25 BEV 26 APA 27 PENGAR 28 SJUKSYSTER 29 APELSIN,
ORANGE 30 BILD 31 32 ÖRM 33 GATA 34 35 TURKIET 36 37 38 39 FÖNSTER 40 ZO

Figure 9. Sample print-out of the
keypunched tests.

generations of each test, as well as on the control administration of the tests to ten adults, until no further errors were detected. This program is given in Appendix 3. The errors the program checks for are listed beginning in Statement 40). Sample output is shown in Figures 10-11. On the first run of the program, all responses which included symbols outside the range of the Swedish alphabet were printed. Most proved to be illegal, with the exception of the '-' as in 'chin-chilla'. On later runs, this symbol was therefore added to the list of legal alphabetic symbols, by indicating this fact on one of the input cards. Also, on the first run the user was asked to examine all responses apparently consisting of more than one string to be sure that the comma to indicate multiple responses to the same item had not been accidentally omitted. On later runs, a control variable was set to zero so that this information would no longer be printed. All but two of the errors were actually detected, including three duplicate identification numbers. Figure 11 shows an error message which was printed for the word 'LÄPP', at first mystifying. Why had the computer printed an error message? This required examination of the original card. The illegal symbol was a 'P' which shows up on the card as 'X'. On three occasions, depression of the 'P' key resulted in the hole-code for a lower-case 'p' (12-11-7), rather than capital 'P' (11-7). Since computer printers can not print lower-case letters the symbol looked legal but definitely wasn't. Thus the program detected an error which was, in theory, impossible to make!

3. The class lists from grade 1 were then merged with the class lists from grade five, and with this merged list as input, a class list was generated consisting only of those students in grade 5 who had studied EPÅL English since grade 1.
4. When the error detection program no longer found errors, it created for each test a data set in which each record contained the student identification number, and the identification number of that test. With a merge of the two data sets thus created, the class list generated in step 3, and the two tests as input, data sets consisting only of legal tests were created, i.e. all tests where the student had both studied EPÅL English since grade 1 and taken each test.
5. Another program then created data sets of the responses to each test, sorted by item, and within item, alphabetically.
6. The final program used this information to create a data set consisting of the diversity of responses to each item, the frequency of that response, and the percent of the total each unique response represented. Responses were stored in order of descending frequency, alphabetically within the same frequency.

FRUKT 39 85 43 85 ✓
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

GRISHONA 51 85 58 85 ✓
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

BRANGE 33 86 38 86 ✓
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

APPER 43 86 48 86 ✓
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

FIRC 22 88 25 88 ✓
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

43 50 94 51 94 ✓
THE CURRENT ITEM NUMBER IS OUT OF SEQUENCE. CHECK REMAINING ITEM NUMBERS TOO.
THE FOLLOWING TEST CONTAINED TOO FEW ITEMS: ELEV NR 355 CARD 90 THROUGH CARD 95 48 ITEM(S).

4U 45 106 66 106 ✓
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

STOR 68 106 71 106 ✓
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

42 1 107 2 107 ✓
THE CURRENT ITEM NUMBER IS OUT OF SEQUENCE. CHECK REMAINING ITEM NUMBERS TOO.
THE FOLLOWING TEST CONTAINED TOO FEW ITEMS: ELEV NR 369 CARD 102 THROUGH CARD 107 49 ITEM(S).

356 1 114 3 114 ✓
THE CURRENT TEST IDENTIFICATION NUMBER IS A DUPLICATE.

CRIS 57 122 60 122 ✓
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

SJUK-SYSTER 32 128 42 128 ✓
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

KLXNZG 50 140 56 140 ✓
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

GRAPE-FRUKT 69 154 7 155 ✓
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

Figure 10. Sample of the errors detected by the program which checked the tests.
In later runs of the program, the hyphen (as in grape-frukt and sluk-syster
above) was added to the list of legal symbols.

29 893 37 893 ✓
P3PPG2UP4
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

10 898 15 898 ✓
BANDIT
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

33 902 38 902 ✓
BRICSA
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

28 907 29 907 ✓
15
THE CURRENT ITEM NUMBER IS OUT OF SEQUENCE. CHECK REMAINING ITEM NUMBERS TOO.

36 911 40 911 ✓
K3NST
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

61 914 62 914 ✓
NU
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

31 917 34 917 ✓
ANKA
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

23 919 24 919 ✓
12
THE CURRENT ITEM NUMBER IS OUT OF SEQUENCE. CHECK REMAINING ITEM NUMBERS TOO.

49 925 52 925 ✓
LAPP
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

58 931 62 931 ✓
SN16L
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

31 946 35 946 ✓
S4SER
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

13 947 18 947 ✓
LIPPAR
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

60 963 71 963 ✓
SID-PROMENAD
THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHABETIC CHARACTERS.

50 993 55 993 ✓
GREVID
THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE PRECEDING STRING DOESN'T EITHER. ERROR?

56 995 60 995 ✓
34335
THE CURRENT (ALPHA)NUMERIC STRING CONTAINS TOO MANY SYMBOLS.

Figure 11. The string to the immediate left contained an illegal 'p'.

7. The above program also prints this information and the printed results were used to calculate the average number of correct responses to the classroom and non-classroom words. Figures 12 and 13 show a sample output from this program.

The average number of correct responses to the classroom words was 51.98%; to the non-classroom words, 4.18%. Since chance could play no role in choosing a correct response, it seems reasonable to conclude that while students inevitably know more classroom than non-classroom words, they have learned, by age 12, at least some words which never appeared in their language lessons. Apart from this information a study of their response yields interesting information about the sorts of words they do and do not know, and their guessing strategies. At the present time, a series of similar tests is in preparation, to be administered in the spring when the students have completed the sixth and last set of teaching materials. As before, each test will consist of either classroom or non-classroom words, but this time automated techniques will be used to derive for each of 12 tests words which belong to the following six classes (adapted to Swedish from Lado, 1957, pp. 82-88).

- 1) Similar form and meaning: bread (bröd), green (grön), hat (hatt), telephone (telefon)
- 2) Similar form and related meaning: frisky (frisk), hound (hund), lust (lust), mat (matta)
- 3) Similar form, different meaning: stool (stol), board (bord), black (blek)
- 4) Similar form, partial semantic overlap: clock (klocka), long (lång), fast (fast), drag (drag)
- 5) Partially and unexpectedly dissimilar form, similar meaning: called up (inkallad), Christianity (kristendom), Christendom (kristenhet)
- 6) Different forms: basket (korg), floor (golv), dog (hund).

As noted above (pp. 22-23), it was intended that none of the test words should be either especially "easy" or especially "hard". Nevertheless, a few words from both categories occurred, in spite of considerable concern to avoid them. The English word beast, e g., is correctly translated by odjur, but best, although less appropriate, is also possible, so the word ought to have been classified "easy" and therefore excluded. An amusing, hardly foreseeable, missclassification was the word colt (baby horse). It was apparently correlated with its use as an English loanword into Swedish, where it refers to the Colt revolver. This is an occasional meaning in English, but a highly improbable interpretation in the particular context. Yet no children and only three adults translated

PS4: T501.FREQ1

ITEM	RESPONSES	FREQUENCY	PERCENT
18 DESK	✓ 1 BANK	192	70.59
	✓ 2 BENK	19	6.98
	3 BORD	13	4.78
	✓ 4 BANKEN	13	4.78
	5	8	2.94
	6 SKOLBANK	5	1.84
	7 KATEDER	4	1.47
	8 DISK	3	1.10
	9 KATED	2	0.73
	10 VÅSKA	2	0.73
	✓ 11 BANK	1	0.37
	✓ 12 BENGK	1	0.37
	13 BORDET	1	0.37
	14 BÄND	1	0.37
	15 BÄNG	1	0.37
	✓ 16 BANKK	1	0.37
	17 DESK	1	0.37
	18 DISKEN	1	0.37
	19 KATEDER	1	0.37
	✓ 20 SKRIVBORD	1	0.37
	✓ 21 SKRIVBORD	1	0.37
19 DRESS	✓ 1 KLÄNNING	129	47.08
	2 DRESS	42	15.33
	✓ 3 KLÄNNING	38	13.87
	✓ 4 KLÄNNINGEN	12	4.38
	5	6	2.19
	6 KLÄDER	6	2.19
	7 ADRESS	4	1.46
	8 DRESSEN	3	1.09
	9 DRÄKT	3	1.09
	10 KJOL	3	1.09
	✓ 11 KLENNING	3	1.09
	✓ 12 KLENNING	2	0.73
	✓ 13 KLENNING	2	0.73
	14 KLÄDERNA	2	0.73
	✓ 15 KLÄNNINGEN	2	0.73
	16 OVERALL	2	0.73
	17 BYXA	1	0.36
	18 SVADRESS	1	0.36
	19 SVADRES	1	0.36
	20 DPES	1	0.36
	21 DRESINS	1	0.36
	22 DRÄSS	1	0.36
	23 JACKA	1	0.36
	24 KAPPA	1	0.36
	✓ 25 KLENNIN	1	0.36
	26 KLÄ PÅ SIG	1	0.36
	27 KLÄ UT SIG	1	0.36
	28 KLÄDESRESS	1	0.36
	29 KOSTYM	1	0.36
	30 OVERALLL	1	0.36
	31 SKJOL	1	0.36

Figure 12. Sample of the printout of the results obtained in the test of classroom words.

P54: T502-FREQ

ITEM

8 BUTTERFLY

RESPONSES	FREQUENCY	PERCENT
✓ 1 FJÄRIL	128	47.58
✓ 2 FLUGA	62	23.05
✓ 3 FJÄRILL	7	2.61
✓ 4 FJÄRILL	6	2.23
✓ 5 FÄGEL	5	1.86
✓ 6 FJÄRILEN	3	1.11
7 SMÖRFLYGARE	3	1.11
8 FLYG DIN VÄG	2	0.74
9 FLYGA	2	0.74
10 SMÖRFLUGA	2	0.74
11 SMÖRFLYG	2	0.74
12 SPÖRGAS	2	0.74
13 SÖPTUNNA	2	0.74
14 SPYFLUGA	2	0.74
15 BÖTFLYGEN	2	0.37
16 BÖTTENFLYGA	1	0.37
17 EKORRE	1	0.37
18 FAMILJEEFTERNAMN	1	0.37
19 FÄRVÄL	1	0.37
✓ 20 FJÄRIL	1	0.37
✓ 21 FJÄRILT	1	0.37
22 FLASKKÖRK	1	0.37
23 FLASKPOST	1	0.37
24 FLUGAN	1	0.37
25 FLYGGINVÄG	1	0.37
26 FLYGGINVÄG	1	0.37
27 FLYGFA	1	0.37
28 FLYGPLAN	1	0.37
✓ 29 FJÄRIL	1	0.37
30 FÄGELFLY	1	0.37
31 FÄGELSKADARE	1	0.37
32 GETING	1	0.37
33 GYTJA	1	0.37
34 HUNLA	1	0.37
35 LILLFÄGEL	1	0.37
36 LYCKA TILL	1	0.37
37 MÅS	1	0.37
38 NYCKELPIGA	1	0.37
39 POSTFLYG	1	0.37
40 PÖL	1	0.37
41 SMÖRFLUGA	1	0.37
42 SMÖRBLÖMMA	1	0.37
43 SMÖRSPAT	1	0.37
44 SMÖRFLYGA	1	0.37
45 SMÖRKÄNIV	1	0.37
46 SMÖRPAKET	1	0.37
47 SMÖRFLUGA	1	0.37
48 UNDERBÄR	1	0.37
49 UNDERBÄR	1	0.37
50 VÄCKER	1	0.37
51 VÄKIST	1	0.37
52 VATTENFLYG	1	0.37
53 ÄNGEL	1	0.37
54 ÄNGEL	1	0.37
55 ÖLFÄGEL	1	0.37

Figure 13. Sample of the printout of the results obtained in the test of non-classroom words.

the word correctly. Because of the risk for such misclassification, partially automated procedures are being developed to insure that all words belong to the intended categories.

One hypothesis is that students will perform as well on non-classroom words in Class 1 as they do on corresponding classroom words. This would suggest that while a large proportion of such words may be desirable in introductory materials, more advanced material should probably focus on words in the other classes, especially class 6. Another expectation is that a comparative study of test results will give empirical evidence for a specific hierarchy of difficulty in English words, and thus provide some objective criteria for selecting the vocabulary of teaching materials and tests for Swedish learners.

In the future, objective techniques for analyzing language teaching materials may be expected to contribute to improvements in language teaching by making it possible to:

1. Prepare Teaching Materials and Tests Which Actually Meet All of a Very Large Number of Clearly-specified Objectives
2. Evaluate Teaching Materials and Tests in Terms of Measurable Criteria
3. Automate Revision of Teaching Materials and Tests
4. Determine Degrees of Convergence between Different Teaching Materials and Tests
5. Design Complex Psycholinguistic Experiments to Test Interactions between Teacher, Learner and Method
6. Detect Bias in Experimental Lessons and Tests
7. Control the Precise Content of (Experimental) Lessons and Tests.

Conclusion

In Linguistics and Reading (1962, p.3) Fries said:

One comes away from a concentrated study of hundreds out of the thousands of these investigations much distressed. He seeks in vain for the cumulative continuity that has characterized all recognized sound scientific research. He struggles hard, without success, to find the strands of fundamental assumptions and accepted criteria of sound procedure running through a series of studies attacking any of the major problems of the teaching of reading.

What he said applies, generally, to language teaching research today. But there is not the slightest reason for such a situation to continue. Means are now available to help and beginnings have been made. As in other areas, scientific method, although obviously necessary, is not sufficient to insure progress. Certain technological advances have also been required. Use of a computer for language data processing can enable one to find out if one's definitions and procedures really are as rigorous as one had thought, and it permits the economic processing of data in significant quantities. Now changes in language teaching can be real improvements based on verifiable experiments and need not merely reflect the swings of fashion. For a country like Sweden, which makes great effort to teach every citizen English, this fact is encouraging.

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Appendix 1. Copy of the program to detect errors, ambiguities
and inconsistencies in the language teaching texts

PAGE 2

```

P46: PROC OPTIONS(MAIN);

      STMT LEVEL NEST
      1
      2 1
      4 2
      5 2
      6 2
      7 2
      8 1
      10 2
      12 2
      15 2
      16 2
      17 2
      19 2
      20 2
      21 2
      22 2
      23 2
      24 1

      P46: PROC OPTIONS(MAIN);
      ON TRANSMIT(IN) BEGIN;
      PUT EDIT (*TRANSMISSION ERROR*)(SKIP,A);
      PUT EDIT(CARD)(SKIP,A);
      STOP;
      END;
      ON ENDFILE(IN) BEGIN;
      IF ALPHA=2 THEN DO;
      IF N7 LT 5 THEN N8=8; ELSE N7=8;
      CALL H;
      END;
      IF J10=0 THEN DO;
      N7=8;
      CALL P;
      END;
      GO TO LB(8);
      END;
      DCL
      (R1(50),R2(50))BIN INIT ((50)0),
      CARD CHAR(80),
      T(72)CHAR(1)DEF CARD,
      SEQ CHAR(8) DEF CARD POS(73), R8(30)CHAR(8), LSEQ
      FIXED(5) INIT(0),
      OLD_SEQ CHAR(8),
      LESSON CHAR(4)DEF CARD,
      STRING CHAR(50) INIT((50)' '),
      S150)CHAR(1)DEF STRING,
      FL1 BIN,
      1 ENTRY UNALIGNED,
      2 ITEM CHAR(24),
      2 M1,
      2 LOC1,
      2 N2,
      2 LOC2,
      2 LIST,
      SET1 CHAR(16),
      SET2 CHAR(8) DEF SET1,
      SET3 CHAR(11) DEF SET1 POS(6),
      (LB( 8),LB(1 5),LB( 8) LABEL,
      NAME CHAR(20) VAR,
      (NP4(0:9),NS(0:11)),
      (NP3(12),SYM,LET)BIN(24),
      EXPL(21)CHAR(80) VAR,
      10(12)CHAR(35),
      R3(90) CHAR(1),
      1 P7(30),
      2 R6 CHAR(72),
      2 P5 CHAR(8),
      R4(30)CHAR(80)DEF R7,
      (F1(16),FR2(16)) BIN,
      LOC(30),
      (LINE1,LINE2,LINE3)CHAR(80),
      ALPHA BIN FIXED;
      NEW=0;
      NR4(10)=1;
      NR4(11)=2;
      25 1
      26 1
      27 1

```

P46: PROC OPTIONS(MAIN);

STAT LEVEL NEST

```

28 1 NR4(2)=NP4(3),NR4(4)=3;
29 1 NR4(8)=4;
30 1 NR4(5),NR4(6),NR4(7)=5;
31 1 NR5(0)=1;
32 1 NR5(3)=2;
33 1 NR5(7)=3;
34 1 NR5(8)=4;
35 1 NR5(9),NR5(10),NR5(11)=5;
36 1 NR5(11),NR5(12),NR5(4),NR5(5),NR5(6)=6;
37 1 DO I=1 TO 2, 5 TO 10;
38 1 NR3(1)=0;
39 1 1
40 1 1
41 1 NR3(3),NR3(4)=24;
42 1 EXPL(1)=NON-ALPHABETIC STRING;
43 1 EXPL(2)=STRING LENGTH EXCEEDED;
44 1 EXPL(3)=WORD LENGTH EXCEEDED;
45 1 EXPL(4)=ILLEGAL INITIAL NON-ALPH SYMBOL;
46 1 EXPL(5)=INITIAL BOUNDARY MARKER NOT IN FIRST POSITION;
47 1 EXPL(6)=CATHOGRAPHIC WORD >2 BEGINS WITH '0';
48 1 EXPL(7)=ORTHOGRAFIC WORD >2 ENDS WITH '0';
49 1 EXPL(8)=ORTHOGRAFIC WORD HAS ILLEGAL MEDIAL SYMBOL;
50 1 EXPL(9)=ILLEGAL FINAL NON-ALPH SYMBOL;
51 1 EXPL(10)=NOT FIRST SYMBOL IN FINAL NON-ALPH SUBSTRING;
52 1 EXPL(11)=NOT THE ONLY MEMBER OF THE NON-ALPH SUBSTRING;
53 1 EXPL(12)=CHECK ***** SINGLE QUOTE OR APOSTROPHE;
54 1 EXPL(13)=TERMINAL PUNCTUATION NOT LAST SYMBOL IN STRING: EMBEDDED QUOT
55 1 EXPL(14)=UNBALANCED VC MARKERS;
56 1 EXPL(15)=VC MARKERS OUT OF ORDER;
57 1 EXPL(16)=LAST STRING IN LESSON BUT NO TERMINAL PUNCTUATION;
58 1 EXPL(17)=ERRORS DETECTED IN THE DATA SET;
59 1 EXPL(18)=NO ERRORS DETECTED IN THE DATA SET;
60 1 EXPL(19)=RUN STATISTICS FOR THE DATA SET;
61 1 EXPL(20)=P46. INPUT DATA SET IS;
62 1 EXPL(21)=FIRST CARD ISN'T A LESSON CARD;
63 1 ID(1)=RUNNING STRINGS;
64 1 ID(2)=RUNNING WORDS;
65 1 ID(3)=MINIMUM STRING LENGTH;
66 1 ID(4)=MINIMUM WORD LENGTH;
67 1 ID(5)=MAXIMUM STRING LENGTH;
68 1 ID(6)=MAXIMUM WORD LENGTH;
69 1 ID(7)=STRINGS LONGER THAN 24 CHARACTERS;
70 1 ID(8)=WORDS LONGER THAN 24 CHARACTERS;
71 1 ID(9)=MODAL STRING LENGTH;
72 1 ID(10)=MODAL WORD LENGTH;
73 1 ID(11)=AVERAGE STRING LENGTH;
74 1 ID(12)=AVERAGE WORD LENGTH;
75 1 16,PRINT,12,N3,N4,N5,J6,J7,J8=0;
76 1 J9=0;
77 1 16=0;
78 1 J10=2;
79 1 SETL=C_-(/,,,)>.:?';
80 1 LOC=0;
81 1 FRI,FR2=0;
82 1 15=1;

```

P46: PROC OPTIONS(MAIN);

STMT LEVEL NEST

```

82 1 N10=7;
83 1 N7,N8=5; N6=7; N9=10;
85 1 LAST=0;
87 1 SYM,LET=0;
88 1 DCL A ENTRY(,,,,,BIN FIXED);
89 1 A:PROC(M1,V2,V3,V4,V5,V6,V7,M8);
90 2 DCL V2,V3,V4,V5, V7)BIN(24),
V6)SOIBIN;
91 2 IF M1 LT V2 THEN V2=M1;
93 2 IF M1 GT V3 THEN V3=M1;
95 2 V4=V4+1;
96 2 V5=V5+M1;
97 2 V6(M1)=V6(M1)+1;
98 2 IF M1 GT 24 THEN DO;
99 1 V7=V7+1;
100 1 CALL G(M8,J6);
101 1 END;
102 1 END A;
103 1 B:PROC;
104 1 IF N4 NE N5 THEN CALL G(14,J7);
105 2 ELSE DO;
107 1 CALL F(1,M3-1,'<');
108 1 CALL F(2,M3,'>');
109 1 END;
110 1 N3,N4,N5=0; 15=1;
111 2 END B;
112 2 C:PROC(V3,V9);
113 1 DCL
114 1 V8)SOIBIN;
115 2 V9 8IN(24);
116 2 MODAL=0;
117 2 DO I=1 TO 50;
118 2 IF V8(I) GT MODAL THEN DO;
119 1 V9=I; MODAL=V8(I);
120 2 END;
121 2 END C;
122 2 D: PROC(M1);
123 1 N3=N3+1;
124 2 M1=M1+1;
125 2 R3(15)=S(11);
126 2 15=15+1;
127 2 END D;
128 2 DCL E ENTRY(BIN FIXED,BIN FIXED);
129 1 E:PROC(M1,M2);
130 1 RF2=FORMAT(SKIP,F(2),2 A);
131 2 DO I1=M1 TO M2;
132 2 IF FR(I1) NE 0 THEN DO;
133 1 J9=J9+1;
134 2 PUT EDIT(J9,' ',EXPL(11))(R(RF2));
135 2 FR2(11)=FR2(11)+1;
136 2 FR1(11)=0;
137 2 END;
138 2 END E;
139 2 DCL F ENTRY(BIN FIXED,BIN FIXED);
140 1
141 2
142 2
143 2
144 1

```

P45: PROC OPTIONS(MAIN);

STMT LEVEL NEST

```

145 1 F:PROC(M1,M2,V1);
146 2 DCL V1 CHAR(1);
147 2 DO I5=M1 TO M2 BY 2;
148 2 IF R3(I5) NE V1 THEN CALL G(I5,J7);
149 2 1
150 2 1
151 2 END F;
152 2 DCL G ENTRY(BIN FIXED,);
153 1 G:PROC(V1,M2);
154 2 FRI(M1)=FRI(M1)+1;
155 2 M2=M2+1;
156 2 END G;
157 1 M:PROC RECURSIVE;
158 2 LAST=2;
159 2 JLO=1;
160 2 N2=72;
161 2 LOC2=R5(I4 );
162 2 I8=14;
163 2 GO TO L3;
164 2 END M;
165 1 O: PROC;
166 2 RF1:FORMAT(SKIP,A,F(2),X(2),F(4),X(2),F(2),X(2),F(4));
167 2 DCL L83(9:10) LABEL;
168 2 GO TO L83(N9);
169 2 L83( 9);
170 2 IF LOC2 LT R5(I4) THEN DO;
171 2 IF LOC(I4-1)=0 THEN LOC(I4-1)=1;
172 2 GO TO L83(I0);
173 2 1
174 2 1
175 2 1
176 2 IF LOC1 LT LOC2 THEN IF LOC(I4 - 1)=0 THEN LOC(I4 - 1)=1;
177 2 IF LOC(I4)=0 THEN LOC(I4)=1;
178 2 L83(I0);
179 2 PUT SKIP;
180 2 PUT EDIT(STRING,N1,LOC1,N2,LOC2)(R(RF1));
181 2 END O;
182 2 P: PROC RECURSIVE;
183 2 RF3:FORMAT(SKIP,A);
184 2 IF J6=0 AND J7=0 THEN CALL O;
185 2 IF J7=0 THEN
186 2 PUT EDIT(R4(I6) D3 I6=16 TO I8)(R(RF3));
187 2 CALL G(I6,J7);
188 2 CALL E(I6,I6);
189 2 GO TO L9(N6);
190 2 END P;
191 2 GET DATA;
192 2 PUT EDIT(EXPL(20),NAME)(I2 A);
193 2 PUT SKIP(2);
194 2 IF PRINT=1 THEN DO;
195 2 OPEN FILE(POOF)PRINT;
196 2 LINE1=(80)";
197 2 LINE2=" 1 2 3 4 5 6
198 2 7
199 2 8;
200 2 LINE3=(9) 1234567890";
201 2 PUT FILE(POOF)EDIT(LINE2)(A);
202 2 PUT FILE(POOF)EDIT (LINE3)(SKIP,A);
203 2 N6=6; N9=9;
204 2 1

```

P46: PACC OPTIONS(MAIN):

STMT	LEVEL	NEST	CODE
206	1	1	END;
207	1		IF NEW=0 THEN
208	1		OPEN FILE(IN)UPDATE;
209	1		READ FILE(IN)INTO(CARD);
210	1		OLD_SEQ=SEQ;LSEQ=LSEQ+1; SEQ=LSEQ;
211	1		IF NEW=1 THEN WRITE FILE(OUT)FROM(CARD);
212	1		ELSE
213	1		REWRITE FILE(IN)FROM(CARD);
214	1		IF LESSON="0000" THEN GO TO L1;
215	1		DO;
216	1		PUT EDIT(EXPL(Z1),CARD,OLD_SEQ)(3 A);
217	1		PUT SKIP(2);
218	1		ALPHA,I=1;
219	1		GO TO L2A;
220	1		END;
221	1		L1:
222	1		ALPHA,I=1;
223	1		L2:
224	1		READ FILE(IN)INTO(CARD);
225	1		OLD_SEQ=SEQ;LSEQ=LSEQ+1; SEQ=LSEQ;
226	1		IF NEW=1 THEN WRITE FILE(OUT)FROM(CARD);
227	1		ELSE
228	1		REWRITE FILE(IN)FROM(CARD);
229	1		IF LESSON="0000" THEN DO;
230	1		IF ALPHA=2 THEN CALL M;
231	1		IF J10=0 THEN DO;
232	1		J10=2; CALL P; END;
233	1		GO TO L2;
234	1		END;
235	1		L2A:
236	1		I4=I4+1;
237	1		R4(I4)=CARD;
238	1		R8(I4)=CLO_SEQ;
239	1		GO TO L4(ALPHA);
240	1		L8(I1);
241	1		DO I=1 TO 72;
242	1		IF T(I) NE " " THEN DO;
243	1		J6,J7,J8,J10=0;
244	1		STRING(50) " ";
245	1		IF I6=0 THEN I6=I4;
246	1		M1=1;
247	1		LOC1=R5(I4) ;
248	1		J=0;
249	1		GO TO L8(2);
250	1		END;
251	1		END;
252	1		GO TO L1;
253	1		L8(2);
254	1		DO I=1 TO 72;
255	1		IF T(I) NE " " THEN DO;
256	1		IF I=1 THEN DO: N2=72;
257	1		:8=I4 - 1;
258	1		ELSE DO;
259	1		N2=I-1;
260	1		LOC2=R5(I4-1); END;
261	1		
262	1		
263	1		
264	1		
265	1		
266	1		
267	1		
268	1		
269	1		
270	1		
271	1		

P46: PROC OPTIONS(MAIN);

STAT LEVEL NEST

```

272 1 3 18=14;
273 1 3 LOC2=RS(14);
274 1 3 END;
275 1 2 I=1;
276 1 2 GO TO L3;
277 1 2 END;
278 1 1 J=J+1;
279 1 1 S(J)=T(1);
280 1 1 END;
281 1 1 I=1;
282 1 1 ALPHA=2;
283 1 1 GO TO L2;
284 1 1 L3:
285 1 1 DO K=1 TO J;
286 1 1 IF S(K)GT"" & S(K) LT '1' THEN GO TO L4;
287 1 1 END;
288 1 1 IF SUBSTR(STRING,1,2)='<>' THEN DO;
289 1 1 IF J GT 2 THEN DO;
290 1 2 N10=8;
291 1 2 J3=2; GO TO L6; END; GO TO L82(8); END;
292 1 2 CALL G(1,J6); GO TO L82(8);
293 1 2 L4:
294 1 2 DO J3 = J TO K BY - 1;
295 1 2 IF S(J3) GT "" & S(J3) LT '1' THEN GO TO L5;
296 1 2 END;
297 1 2 L5:
298 1 2 L_WRD= (J3-K)*1;
299 1 2 IF K GT 1 THEN DO I1=1 TO K - 1;
300 1 2 J4=INDEX(SET2,S(I1));
301 1 2 GO TO L81(NR4(I4));
302 1 2 L81(1);
303 1 2 CALL G(4,J6);
304 1 2 GO TO L81(5);
305 1 2 L81(2);
306 1 2 CALL D(N5);
307 1 2 L81(3);
308 1 2 IF I1 GT 1 THEN CALL G(5,J6);
309 1 2 GO TO L81(5);
310 1 2 L81(4);
311 1 2 IF I1=1 THEN I2=1;
312 1 2 L81(5); END;
313 1 2 IF L_WRD=1 THEN GO TO L6;
314 1 2 IF S(K)='0' THEN CALL G(6,J6);
315 1 2 IF S(J3)='0' THEN CALL G(7,J6);
316 1 2 IF L_WRD GT 2 THEN DO I1=K+1 TO J3-1;
317 1 2 IF S(I1) GT '2'
318 1 2 OR S(I1) LT 'A' AND S(I1) NE '...' AND S(I1) NE '...'
319 1 2 THEN CALL G(8,J6);
320 1 2 END;
321 1 2 L6:
322 1 2 IF J GT J3 THEN DO I1= J3+1 TO J;
323 1 2 J4=INDEX(SET3,S(I1));
324 1 2 GO TO L82(NR5(J4));
325 1 2 L82(1);
326 1 2 CALL G(9,J6);
327 1 1
328 1 1
329 1 1
330 1 1
331 1 1
332 1 1
333 1 1

```

P46: PROC OPTIONS(MAIN);

```

      STMT LEVEL NEST
334 1 1 GO TO LB2(6);
335 1 1 LB2(2);
336 1 1 IF SJ3='S' AND I1-J3+1 THEN DO;
337 1 2 L_WRD=L_WRD+1; J3=J3+1;
339 1 2 IF I2=1 THEN CALL G(12,J7);
341 1 2 END;
342 1 1 GO TO LB2(6);
343 1 1 LB2(3);
344 1 1 IF I1 NE J3+1 THEN CALL G(10,J6);
345 1 1 CALL D(N4);
346 1 1 GO TO LB2(6);
347 1 1 LB2(4);
348 1 1 IF J NE J3+1 THEN CALL G(11,J6);
349 1 1 GO TO LB2(6);
350 1 1 LB2(5);
351 1 1 I2=0; LAST=1;
352 1 1 J10=1;
353 1 1 IF I1 NE J THEN CALL G(13,J7);
355 1 1 LB2(6); END;
356 1 1 GO TO LB2(N10);
357 1 1 LB2(7);
      CALL A
      (L_WRD,NR3(4),NR3(6),NR3(12),LET,R2,NR3(8),3);
358 1 LB2(8);
      CALL A(J,NR3(3),NR3(5),NR3(1),SYM,R1,NR3(7),2);
359 1 N10=7;
360 1 IF LAST GE 1 THEN IF N3 GT 0 THEN CALL B;
363 1 IF LAST=2 THEN
364 1 CALL G(16,J7);
365 1 IF J6 CR J7 NE 0 THEN CALL O;
367 1 ELSE GO TO L7;
368 1 RF3=FORMAT (SKIP,A);
369 1 IF J7 NE 0 THEN
370 1 PUT EDIT(14(16) DO 16=16 TO 18))(R(RF3));
371 1 IF J6 NE 0 THEN
372 1 CALL E(1,1);
373 1 IF J7 NE 0 THEN
374 1 CALL E(12,16);
375 1 L7:
376 1 IF LAST GE 1 THEN GO TO LB(N6);
377 1 GO TO LB(N7);
378 1 LB(3);
      STRING=SUBSTR(STRING,K,L_WRD);
379 1 LB(4);
      ITEM=STRING;
380 1 WRITE FILE(STR) FROM(ENTRY);
381 1 GO TO LB(N8);
382 1 LB(5);
383 1 IF I GT 72 OR LESSON='0000' THEN GO TO L1;
384 1 GO TO LB(1);
385 1 LB(6);
      DO I1=1 TO 14;
386 1 IF LOC(I1)=1 THEN DO;
388 1 PUT FILE(POOF)EDIT(14(11))(R(RF3));
389 1 PUT FILE(POOF)EDIT(16(11))(X(4),A);

```

P46: PROC OPTIONS(MAIN);

```

SYMT LEVEL NEST
390 1 2 PUT FILE(PROOF)EDIT(LINE1) (R(RF3));
391 1 2 PUT FILE(PROOF)EDIT(LINE2) (R(RF3));
392 1 2 PUT FILE(PROOF)EDIT(LINE3) (R(RF3));
393 1 2 END;
394 1 1 IF LOC(14)=1 THEN DO;
395 1 1 LOC(11),11=2; END;
397 1 1 ELSE 11=1;
399 1 1 DO 11=1 TO 14;
400 1 1 LOC(11)=0;
401 1 1 END;
402 1 1 LB(7);
403 1 1 17=14;
404 1 1 IF 1 LT 73 THEN DO;
406 1 1 IF 14 GT 1 THEN R4(1)=R4(14);
408 1 1 11=2; 14=1;
410 1 1 END;
411 1 1 ELSE DO; 11=1; 14=0;
414 1 1 END;
415 1 1 IF 11 LE 17 THEN DO 11=11 TO 17;
417 1 1 R4(11)=180; *;
418 1 1 END;
419 1 1 16=0;
420 1 1 LAST=0; IF J10=2 THEN GO TO L2; GO TO LB(N7);
424 1 1 LB(8);
425 1 1 PUT PAGE;
426 1 1 NR3(11)=SYM/NR3(11);
427 1 1 NR3(12)=LET/NR3(2);
428 1 1 CALL C(R1,NR3(9));
429 1 1 CALL C(R2,NR3(10));
430 1 1 RF:FORMAT (SKIP(2),A,COL(40),F(10));
431 1 1 RF4:FORMAT(3 A,F(4));
432 1 1 RF5:FORMAT
(SKIP,A,COL(10),F(2),COL(15),2 A,COL(85),F(2));
433 1 1 PUT EDIT((10(1),NR3(1) DO 1=1 TO 12))(R(RF));
434 1 1 PUT PAGE;
435 1 1 FL1=SUM(FR2);
436 1 1 IF FL1=0 THEN PUT EDIT(EXPL(18),NAME);SKIP(2),2 A);
437 1 1 ELSE DO;
438 1 1 PUT EDIT (EXPL(17),NAME,*,*,FL1)(R(RF4));
439 1 1 PUT SKIP;
440 1 1 PUT EDIT(1=ERROR *,1,EXPL(1),*,*,FR2(1) DO 1=1 TO 16))
(R(RF5));
441 1 1 END;
442 1 1 END P46;
443 1 1

```

49A

LÄRARHÖGSKOLAN I UPPSALA

Pedagogiska institutionen

Det somras! Och EPÅL-grupperna har enligt uppgift hunnit läsa färdigt Hallo Everybody 3. Inför skolans slut skulle vi därför gärna vilja kunna få en liten inblick i deras nuvarande ordkunskaper. Syftet är ingalunda någon elev- eller klassvis jämförelse. Vi har alltså inte tänkt oss något prov i vanlig mening.

Frågan vi ställer oss bygger på ett märkvärdigt förhållande här i Sverige, som kanske inte råder någon annanstans i världen. Det är nämligen så att goda kunskaper i engelska upplevs av de flesta som något helt positivt, bland ungdomen även som nyckeln till att ha roligt och spännande. Man tänker närmast på engelsk popmusik, TV, filmer mm. Av denna anledning är det helt tänkbart att även yngre barn kan en del engelska ord som inte förekommer i själva läroböckerna.

Nu hoppas vi kunna undersöka saken lite närmare. För att kunna lyckas med det behöver vi Din hjälp.

Så här har vi tänkt oss gå till väga. Senast den 26 maj kommer Du att få listor bestående av ca 100 engelska ord. Varje barn ska få ett eget ex. att arbeta med. Hälften av orden har förekommit i läroböckerna. Andra hälften har inte det. Eleverna ska uppmanas översätta alla orden till svenska på ett särskilt ställe på listan. Detta är allt. De ska inte ens behöva fylla i namn, personnummer osv eftersom listorna från början blir försedda med dessa uppgifter. Du får själv avgöra när barnen skall komplettera uppgifterna. Ett enda lektionstillfälle borde väl räcka, men Du kan likaväl använda en del utav två sådana. När allt är klart ska listorna återsändas i ett för detta ändamål i förväg adresserat kuvert.

Det här blir första gången man har kunnat tänka sig något sätt att handskas med frågan eftersom man aldrig tidigare har haft någon möjlighet att fastställa vilka ord en viss grupp elever säkert har inövat under kända förutsättningar. Men nu - kanske är det en engångsföreteelse - kan vi det. Vi är därför mycket tacksamma om vi får lov att ta i anspråk Din outhärliga medhjälp. Du kommer naturligtvis att meddelas om de nådda resultaten.

Med vänliga hälsningar

Nancy Belmore

Nancy Belmore, Ph.D.

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Härmed bifogas de engelska ordlistorna vi talat om för några veckor sedan.
Några komihåg:

1. Vill Du att barnen ska översätta alla ord på en gång? Då är det helt OK att dela ut båda sidor på en gång. Men vill Du inte det var vänlig och dela inte ut sida 2 tills det blir dags.
2. Som Du märker är det meningen att varje barn ska ha sina egna listor. Men vi har kanske utelämnat ett par barn. Dessa barn ska använda de listorna utan namn på, som också bifogas. Då ska de uppmanas att fylla i namnet m m.
3. När barnen håller på med översättningar skulle vi bli mycket tacksamma om Du vill kontrollera att alla går till väga på det rätta sättet.
4. När allting blir klart använd gärna det bifogade kuvertet för att återsända listorna.
5. Alla listorna ska återsändas även om vederbörande inte översatt orden p g a frånvaro e dyl.

Tusen Tack!

Hälsningar

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Tusen Tack!

Hälsningar

Nancy Belmore

Nancy Belmore

PAGE 2

P49:PROC OPTIONS(MAIN);

STMT LEVEL NEST

```

1 1 P49:PROC OPTIONS(MAIN);
2 1 ON TRANSMIT(IN) BEGIN;
4 2 PUT EDIT ('TRANSMISSION ERROR')(SKIP,A);
5 2 PUT EDIT(CARD)(SKIP,A);
6 2 STOP;
7 2 END;
8 1 ON ENDFILE(IN) BEGIN;
10 2 IF ITEM NE 50 THEN DO;
12 3 J1=L_SEQ;
13 3 IF ITEM GT 50 THEN CALL C(8);
15 3 ELSE CALL C(12);
16 3 END;
17 2 IF N=2 THEN DO;
19 3 N2=72;
20 3 LOC2=L_SEQ;
21 3 DO K=1 TO J;
22 3 IF SIX GT 'Z' THEN DO;
24 4 CALL ERR(19);
25 4 GO TO LB(3);
26 4 END;
27 3 END;
28 2 IF J GT L_MAX THEN L_MAX=J;
29 2 END;
30 1 N=3;
31 1 GO TO L2;
32 1 END;
33 1 GO TO LB(3);
34 1 END;
35 1 DCL
    STRING CHAR/50 INIT ('50' ),
    S150(CHAR(1)) DEF STRING,
    NR1(500) FIXED,
    NR2(10),
    LB(3),LB1(2:5) LABEL,
    SET1 CHAR(20)VAR INIT('AAO'),
    OSN CHAR(30)VAR,
    1 LIST UNALIGNED,
    2 IO,
    2 TEST BIN FIXED,
    2 PAD CHAR(14) INIT('14' ),
    (CARD,L_CARD)CHAR(50),
    T(72)CHAR(1) DEF CARD,
    SEQ CHAR(8) DEF CARD POS(73),
    IL_SEQ,
    LOC1,LOC2) FIXED (5),
    1D_SEQ FIXED,
    EXPL(20)CHAR(120)VAR,
    (LINE1,LINE2,LINE3)CHAR(80);
    LINE1='(80)' ;
    LINE2='
      1      2      3      4      5      6
      7
      8';
    LINE3='(18)'1234567890';
    EXPL( 1)='P49: THE OUTPUT DATA SET IS ';
    EXPL( 2)='THE FIRST CARD IS NOT A LEGAL IDENTIFICATION CARD.';
    EXPL( 3)='THE ABOVE ALPHABETIC STRING IMMEDIATELY FOLLOWS A TEST IDENTI
    FICATION CARD.';
    EXPL(4)='THE ABOVE ALPHABETIC STRING DOES NOT END IN A COMMA, AND THE P
    RECEDING STRING DOESN'T EITHER. ERROR?';

```

P45:PROC OPTICNS(MAIN):

STMT LEVEL NEST

```

43 1 EXPL(5)='THE CURRENT STRING INCLUDES BOTH ALPHABETIC AND NON-ALPHA SET
C CHARACTERS.'
44 1 EXPL(6)='ALTHOUGH THE PREVIOUS ALPHABETIC STRING ENDED IN A COMMA, THE
CURRENT STRING IS NUMERIC.'
45 1 EXPL(7)='THE CURRENT ITEM NUMBER IS OUT OF SEQUENCE. CHECK REMAINING I
TEM NUMBERS TOO.'
46 1 EXPL(8)='THE FOLLOWING TEST CONTAINED TOO MANY ITEMS.'
47 1 EXPL(9)='THE CURRENT STRING IS A 3-DIGIT NUMBER WHICH DOESN'T OCCUR I
N COLUMNS 1-3.'
48 1 EXPL(10)='THE CURRENT STRING IS A 3-DIGIT NUMBER IN COLUMNS 1-3 BUT COL
UMNS 4-72 ARE NOT ENTIRELY BLANK.'
49 1 EXPL(11)='THE CURRENT TEST IDENTIFICATION CARD IS IMMEDIATELY PRECEDED
BY A TEST IDENTIFICATION CARD.'
50 1 EXPL(12)='THE FOLLOWING TEST CONTAINED TOO FEW ITEMS.'
51 1 EXPL(13)='THE CURRENT TEST IDENTIFICATION NUMBER IS A DUPLICATE.'
52 1 EXPL(14)='THE CURRENT (ALPHA)NUMERIC STRING CONTAINS TOO MANY SYMBOLS.'
53 1 EXPL(15)='A BLANK TO INDICATE THE NULL STRING HAS BEEN OMITTED.'
54 1 EXPL(16)='NO ERRORS DETECTED IN THE ABOVE DATA SET.'
55 1 EXPL(17)='WAS THE MAXIMUM STRING LENGTH IN THE DATA SET.'
56 1 EXPL(18)='TESTS WERE PROCESSED.'
57 1 EXPL(19)='THE LAST STRING IN THE DATA SET IS AN (ALPHA)NUMERIC STRING W
HICH ENDS IN COLUMN 72.'
58 1 NR2(1),NR2(2)=2;
59 1 NR2(3)=3;
60 1 NR2(4)=4;
61 1 DO J=6 TO 10;
62 1 NR2(J)=4;
63 1 END;
64 1 NR2(5)=5;
65 1 STRERROR=0;
66 1 M,ITEM,L_MAX=0;
67 1 J7=0;
68 1 J8=1;
69 1 LSEQ=0;
70 1 NR1=0;
71 1 N,I=1;
72 1 L_SEQ=1;
73 1 LOC1,LOC2=0;
74 1 N1,N2,M2=0;
75 1 ID=0;
76 1 ID_SEQ=1;
77 1 J6=1;
78 1 A: PROC;
79 1 LAST=0;
80 1 ITEM=ITEM+1;
81 1 IF J7 = 0 AND
ITEM NE SUBSTR(STRING,1,J) THEN DO;
82 2 CALL ERR(7);
83 2 J7=1;
84 2 END;
85 2 END A;
86 2 B: PROC(1);
87 1 DCL V1 CHAR(80);
88 2 RF3:FORMAT (SKIP,A);
89 2

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P49:PROC OPTIONS(MAIN);

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90 2 PUT FILE(PROOF)EDIT(V1,1) (R(RF3));
91 2 PUT FILE(PROOF)EDIT(LINE1) (R(RF3));
92 2 PUT FILE(PROOF)EDIT(LINE2) (R(RF3));
93 2 PUT FILE(PROOF)EDIT(LINE3) (R(RF3));
94 2 END B;
95 1 DCL C ENTRY(BIN FIXED);
96 1 C: PROC(M1);
97 2 ERROR=ERROR+1;
98 2 PUT EDIT(EXPL(M1))(SKIP(2),A);
99 2 PUT EDIT(LEVEL NR, ID, CARD, ID_SEQ, THROUGH CARD,
    J1,ITEM, ITEM(S),
    (A,F(4),A,F(5),A,F(5),F(5),A);
    END C;
    D: PROC RECURSIVE;
    ERROR=ERROR+1;
    M=M+1;
    PUT EDIT (EXPL(2))(SKIP(2),A);
    PUT EDIT (CARD)(SKIP,A);
    GO TO LB11;
    END D;
    DCL ERR ENTRY(BIN FIXED);
    DCL ERR1 ENTRY(BIN FIXED);
    110 1 ERR: PROC (M1);
    111 2 RF2=FORMAT(SKIP,A,F(3),F(5),F(3),F(5));
    112 2 ERROR=ERROR+1;
    113 2 ERR1: ENTRY(M1);
    114 2 IF STR=0 THEN DO;
    115 2 STR=1;
    116 2 PUT SKIP(2);
    117 2 PUT EDIT(STRING,M1,LOC1,M2,LOC2)(R(RF2));
    118 2 END;
    119 2 IF M1 NE M2 THEN
    120 2 PUT EDIT (EXPL(M1))(SKIP,A);
    121 2 M2=M1;
    122 2 IF LSEQ = LOC2 THEN RETURN;
    123 2 IF LOC1 LT LOC2 THEN DO;
    124 2 IF LSEC NE LOC1 THEN CALL BIL_CARD;
    125 2 END;
    126 2 IF LSEQ NE LOC2 THEN DO;
    127 2 IF LOC2= L_SEQ - 1 THEN CALL BIL_CARD;
    128 2 ELSE CALL B(CARD);
    129 2 END;
    130 2 LSEQ=LOC2;
    131 2 END ERR;
    132 2
    133 2
    134 2
    135 2
    136 2
    137 2
    138 2
    139 2
    140 2
    141 2
    142 2
    143 2
    144 2
    145 2
    146 2
    147 2
    148 2
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P49:PROC OPTIONS(MAIN);

SYMT LEVEL NEST

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149 1 1 IF T(K) LT '0' OR T(K) GT '9' THEN CALL D;
151 1 1 END;
152 1 1 DO K=4 TO 72;
153 1 1 IF T(K) NE ' ' THEN CALL D;
155 1 1 END;
156 1 1 ID=SUBSTR(CARD,1,3);
157 1 1 ID_SEQ=L_SEQ;
158 1 1 NRI(ID)=ID;
159 1 1 M=N+1; LAST=1; MAX=ID;
162 1 1 L1;
163 1 1 L_CARD=CARD;
164 1 1 READ FILE(IN) INTO(CARD);
165 1 1 L_SEQ=L_SEQ+1;
166 1 1 SEQ=L_SEQ;
167 1 1 WRITE FILE(OUT) FROM(CARD);
168 1 1 GO TO L8(N);
169 1 1 L8(1);
170 1 1 DO I=1 TO 72;
171 1 1 IF T(I) NE ' ' THEN DO;
172 1 1 N1=1;
173 1 1 LOC1=L_SEQ;
174 1 1 STRING=1501' ';
175 1 1 STR=0;
176 1 1 M2, J=0;
177 1 1 GO TO L8(2);
178 1 1 END;
179 1 1 I=1; GO TO L1;
181 1 1 L8(2);
182 1 1 DO I=1 TO 72;
183 1 1 IF T(I) NE ' ' THEN DO;
184 1 1 IF I=1 THEN DO;
185 1 1 N2=72;
186 1 1 LOC2=L_SEQ - 1;
187 1 1 END;
188 1 1 ELSE DO;
189 1 1 N2=I - 1;
190 1 1 LOC2=L_SEQ;
191 1 1 END;
192 1 1 IF J GT L_MAX THEN L_MAX = J;
193 1 1 I=I+1;
194 1 1 N=1;
195 1 1 GO TO L2;
196 1 1 END;
197 1 1 J=J+1;
198 1 1 S(J)=T(I);
199 1 1 N2=N+1;
200 1 1 I=1; GO TO L1;
201 1 1 L2;
202 1 1 IF S(I) LT '0' THEN DO;
203 1 1 IF LAST=1 THEN CALL ERR(3);
204 1 1 IF LAST=3 AND J8=1 THEN CALL ERR(4);
205 1 1 IF S(J) NE ' ' THEN DO;
206 1 1 LAST=2;
207 1 1 J=J - 1;
208 1 1

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P49:PROC OPTIONS(MAIN);

STMT	LEVEL	NEST	CODE
215	1	2	END;
216	1	1	ELSE LAST=3;
217	1	1	DO K=1 TO J;
218	1	1	IF S(K) LT 'A' THEN DO;
220	1	3	K1=INDEX(SET1,S(K));
221	1	3	IF K1=0 THEN CALL ERR(5);
223	1	3	END;
224	1	2	END;
225	1	1	DO K=2 TO J;
226	1	2	IF S(K) GT 'Z' THEN CALL ERR(5);
228	1	2	END;
229	1	1	GO TO LB(N);
230	1	1	END;
231	1	1	DO K=1 TO J;
232	1	1	IF S(K) LT '0' OR S(K) GT '9' THEN DO;
234	1	2	CALL ERR(5);
235	1	2	GO TO LB(N);
236	1	2	END;
237	1	1	END;
238	1	1	IF LAST=2 THEN CALL ERR(6);
240	1	1	GO TO LB1(NP2(J));
241	1	1	LB1(2);
242	1	1	CALL A;
243	1	1	GO TO LB(N);
244	1	1	LB1(3);
245	1	1	IF N1 NE 1 AND N2 NE 3 THEN DO;
246	1	1	CALL ERR(9);
247	1	1	GO TO LB(N);
248	1	1	END;
249	1	1	L3:
250	1	1	DO K= 4 TO 72;
251	1	2	IF T(K) NE ' ' THEN DO;
252	1	2	CALL ERR(10);
253	1	2	GO TO LB(N);
254	1	1	END;
255	1	1	IF LAST=1 THEN DO;
257	1	1	CALL ERR(11);
258	1	1	GO TO L4;
259	1	1	END;
260	1	1	LAST=1;
261	1	1	IF ITEM NE 50 THEN DO;
263	1	1	J1=L_SEQ -1;
264	1	1	IF IT="GT 50 THEN CALL C(8);
266	1	1	ELSE CALL C(12);
267	1	1	L4:
268	1	1	L5:
269	1	1	ID_SEQ=L_SEQ;
270	1	1	ID=SUBSTR(STAING,1,3);
272	1	1	IF NR1(ID)=0 THEN NR1(ID)=ID;
273	1	1	ELSE CALL ERR(13);
274	1	1	M=M+1;
276	1	1	IF ID GT MAX THEN MAX=ID;
277	1	1	J7=0;
			ITEM=0; LAST,1,N=1; GO TO L1;

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P49:PROC OPTIONS(MAIN):

STMT	LEVEL	NEST	
280	1		LB1(4):
			CALL ERR(14):
281	1		GO TO LB(N):
282	1		LB1(5):
283	1		IF N1=71 AND N2=3 THEN DO:
284	1	1	J=2:
285	1	1	CALL A:
286	1	1	CALL ERR(15):
287	1	1	STRING=SUBSTR(STRING,3,3):
288	1	1	GO TO L3:
289	1	1	END:
290	1		CALL ERR(14):
291	1		GO TO LB(N):
292	1		LB(3):
			PUT PAGE:
293	1		PUT EDIT(L_MAX,EXPL(17),DSN,'')
			(F(3),3 A):
294	1		PUT SKIP:
295	1		PUT EDIT(P,EXPL(18))(F(3),A):
296	1		IF ERRCF=0 AND J6 = 1 THEN DO:
297	1	1	PUT EDIT(EXPL(16))(SKIP,A):
298	1	1	DO I=1 TO MAX:
299	1	2	IF NR1(I) NE 0 THEN DO:
300	1	3	ID=NR1(I):
301	1	3	WRITE FILE(OUT)FROM(LIST):
302	1	3	END:
303	1	2	END:
304	1	1	END P49:
305	1		
306	1		